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TUBERCULOSIS A PREVENTABLE AND CURABLE DISEASE

S. ADOLPHUS KNOPF

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TUBERCULOSIS

A PREVENTABLE AND CURABLE DISEASE

IMPORTANT RECENT BOOKS AND MONOGRAPHS BY THE SAME AUTHOR:

"Les Sanatoria." Thèse pour le Doctorat en Médecine. Présentée et soutenue devant la Faculté de Médecine de Paris. Paris, 1895

"Les Sanatoria, Traitement et Prophylaxie de la Phtisie Pulmonaire." Paris, 1900

"Pulmonary Tuberculosis, Its Modern Prophylaxis and the Treatment in Special Institutions and at Home." Alvarenga Prize Essay. Philadelphia, 1899

"Die Tuberkulose als Volkskrankheit und deren Bekämpfung." Kongress Preisschrift. Berlin, 1900

"Tuberculosis as a Disease of the Masses and How to Combat It." Six editions from 1900 to 1909. New York

Translations of this have appeared as Arabic, Brazilian, Bulgarian, Chinese, Dutch, English, Finnish, French, Hebrew, Hungarian, Icelandic, Italian, Japanese, Mexican, Norwegian, Polish, Russian, Serbian, Siberian, Spanish, Swedish, and Turkish editions between 1900 and 1909.

"Tuberculosis" in Twentieth Century Practice of Medicine. New York, 1900

"A Few Thoughts on the Medical and Social Aspect of Tuberculosis at the Beginning of the Twentieth Century." Contribution to Prof. von Leyden's Festschrift. Berlin, 1902

"Woman's Duty Towards the Health of the Nation." Boston, 1904

"Medicine and Law in Relation to the Alcohol, Venereal Disease and Tuberculosis Problems." New York, 1906

"A Plea for Cremation." Chicago, 1907

"Tuberculosis" in Nelson's Encyclopedia. New York, 1907

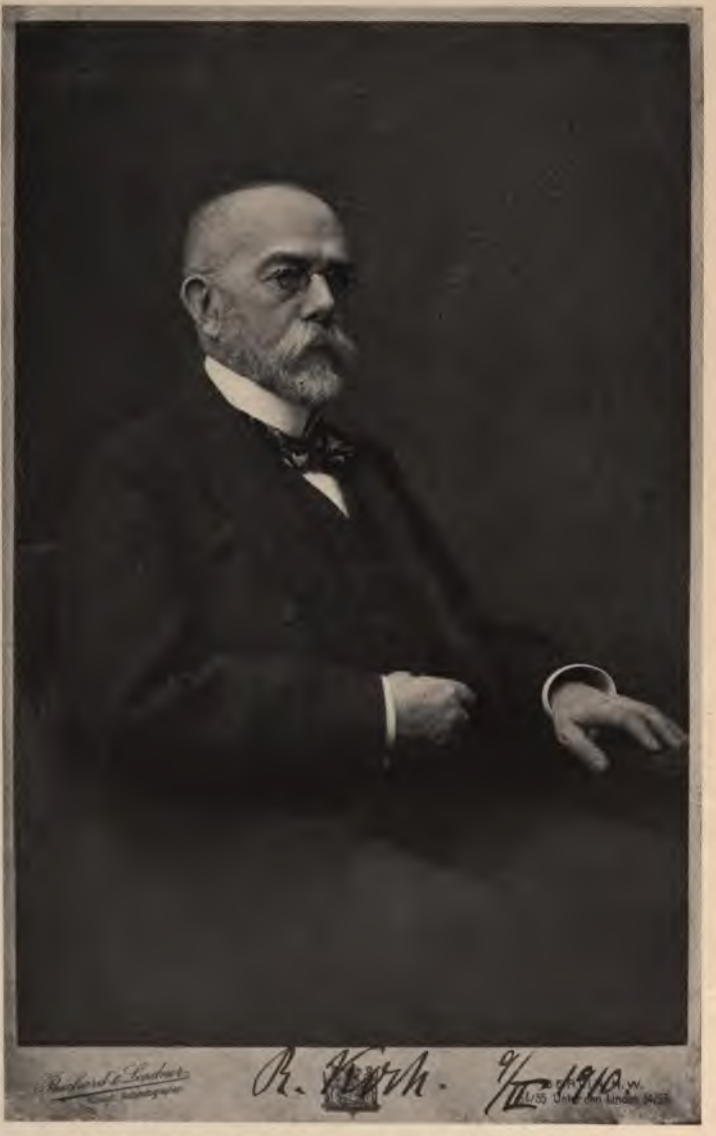
"The Etiology, Prophylaxis and Treatment of the Social Ill." New York, 1908

"A Plea for More Sanatoria for the Consumptive Poor in all Stages of the Disease." New York, 1908

"Sun, Air, and Water, Their Use in the Preservation of Health and the Cure of Disease." Washington, 1908

"Public Measures in the Prophylaxis of Tuberculosis." Contribution to the American Treatise on Tuberculosis. New York, 1909

"The Hopeful Outlook of the Tuberculosis Problem in the United States. St. Louis, 1909



Professor Robert Koch, Discoverer of the Tubercle Bacillus.

TUBERCULOSIS

A PREVENTABLE AND CURABLE DISEASE

MODERN METHODS FOR THE SOLUTION OF THE TUBERCULOSIS PROBLEM

BY

S. ADOLPHUS KNOPF, M. D.

Professor of Phthisio-therapy at the New York Post-Graduate Medical School and Hospital; Associate Director of the Clinic for Pulmonary Diseases of the Health Department; Attending Physician to the Riverside Sanatorium for Consumptives of the City of New York, etc.

SECOND EDITION

NEW YORK

MOFFAT, YARD AND COMPANY

1910

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PUBLISHED, JUNE, 1909

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To my MASTERS in MEDICINE in America, France, and Germany, by whose wisdom I am guided, by whose experience I gain courage for my work, and whose lives are my constant inspiration.

To the NOBLE MEN and WOMEN inside and outside of the medical profession all over the civilized world, whose unselfish labors have been so helpful to the anti-tuberculosis cause.

To the STATESMAN and PHILANTHROPISTS to whose wisdom and generosity we look for help in the realization of our utmost desires, the eradication of the Great White Plague.

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MOTTO

To combat tuberculosis successfully, requires the combined action of a wise government, well-trained physicians, and an intelligent people.

PREFACE TO SECOND EDITION

The first edition of this volume was more than kindly received by the medical profession and the general public. For the words of praise which were bestowed upon it in numerous reviews and personal letters I feel deeply grateful. The criticisms were few, but for them also I wish to express my sincerest thanks. Some referred to scientific points about which none of us as yet are certain, others referred to more or less serious typographical errors which have now been corrected, and a few new phases in the popular campaign have been described.

To one assertion, however, which appeared in two or three of the criticisms I must reply in detail, and leave the public to judge the right of the case. It has been said that a number of my statements regarding the prevention and cure of tuberculosis, in its social as well as in its medical aspect, were non-authoritative, and not based on experience. My reply to this serious criticism is merely to enumerate the opportunities which I have had in the space of twenty-five years, for the study and observation of this disease.

I began my medical career as a student at the Medical College of the University of Southern California, in the early 'eighties. My first important position was that of interne in the Los Angeles County Hospital, where the majority of patients consisted of consumptives, nearly all of them in the more advanced stages. They had come thither thinking that the glorious climate alone would suffice to cure them. Some had come with little or no money, others had spent their all and had not enough left to return to their Eastern homes which, perhaps, all of them had left in the hope that a few weeks in Southern California would restore them to health and vigor when they would find work and be able to support themselves. This delusion filled the Los Angeles County Hospital, year in and year out, with hundreds of poor, discouraged consumptives, many of them hopelessly ill. They became a burden to a strange community. It was this situation which inspired me to devote my life to the anti-tuberculosis cause, to seek out and to study the means of curing tuberculosis as far as it was practicable without regard to climate, and to labor for the early recognition of the disease.

I came to New York to finish my studies in the celebrated Bellevue Hospital Medical College, where I also took my degree. In those days con-

sumptives were treated in general hospitals. It was nothing unusual for a consumptive to have some one afflicted with malaria, pneumonia, or heart disease as a neighbor in the ward. Under these conditions consumption was propagated among other patients, nor was the infection confined to the patients alone. I sadly remember that not a few of my colleagues, serving in the hospitals, fell victims to the disease.

Subsequent to my graduation at Bellevue I engaged in general practice in the tenement house districts of New York. Here I learned much of the social causes of tuberculosis, of the tenement house problem, alcoholism, sweatshops, and child labor,—all predisposing factors to tuberculosis. Feeling that I had much more to learn regarding tuberculosis science, I went abroad and devoted six years to additional study. I remained several years in Paris, matriculated as a regular medical student, and served as assistant in the general and special hospitals, which enabled me to take the degree of Doctor of Medicine of that great faculty. Prior to presenting my thesis for this degree, I visited all the leading European and American sanatoria and health resorts consecrated to the treatment of tuberculosis. My French doctor thesis had for its title "Les Sanatoria, Traitement et Prophylaxie de la Phtisie

Pulmonaire." Because of the above mentioned criticisms I may be permitted to mention that this thesis received the highest mark (extrêmement satisfait) from the jury which presided over its defense, and the French Academy of Medicine and the Institute of France made the author of it a laureate. The enlarged English translation of this thesis was awarded with the Alvarenga prize by the College of Physicians of Philadelphia in 1898.

My practical training as a sanatorium physician I received after my graduation in Paris, by a lengthy sojourn in the Falkenstein Sanatorium as assistant to that great and immortal teacher of modern phthisio-therapy, Geheimrath Professor Dettweiler, then Director of that institution.

The two above mentioned volumes which passed several editions were purely scientific treatises, but it was also the author's good fortune to receive recognition for his popular essay entitled "Tuberculosis as a Disease of the Masses and How to Combat it." The Tuberculosis Congress which convened in Berlin in 1899 bestowed upon this work the International Congress prize of 4000 Marks ($1000). This little essay has since been translated into 25 different languages and largely distributed throughout the civilized world.

Since my return to the United States in 1896, I have had no lack of opportunities to study tuber-

culosis in its sociological as well as in its medical aspect. It is my privilege to have been one of the founders of the New York Tuberculosis Committee, and of our National Association for the Study and Prevention of Tuberculosis. The admirable work of these organizations, as far as the social combat of tuberculosis is concerned, is too well known to need mentioning here. Through the many years of my connection with the New York Health Department as Associate Director of its clinics for pulmonary diseases and as senior attending physician of the Riverside Hospital-Sanatorium for the consumptive poor of this city, I believe that my opportunities for observing and learning have been and are still exceptional. It is on the basis of these many years of experience that I have laid down in this volume what I consider not only my thoughts but those of the best among our leading tuberculosis specialists.

In conclusion I should like to reproduce a few of the opinions that have been expressed by leading men on the appearance of the first edition of this volume:

HIS EXCELLENCY, REAL PRIVY COUNCILLOR, PROFESSOR ROBERT KOCH, of Berlin.

"Such work as yours should be welcomed, as it is destined to play an important part in the enlightenment of the people and the American people seem to me

particularly susceptible to such education. Your book is sure to meet with great success."

WILLIAM OSLER, M. D., LL. D., Regius Professor of Medicine, Oxford University, England.

"I am greatly pleased with your new book. It is admirable in every way—form and substance are equally good. I am sure it must be having a great success."

MR. ERNEST P. BICKNELL, Director of the American National Red Cross, Washington, D. C.; Formerly Superintendent Chicago Bureau of Charities.

"I have been testing the value of this book by submitting to it many of the questions and problems which have been encountered in a somewhat extended and varied relationship with persons afflicted by tuberculosis in tenements, hovels, schools, shops, and public institutions. And in every instance I have found the answer concise, definite, positive."

HERMANN M. BIGGS, M. D., LL. D., Professor of Medicine, New York University and Bellevue Medical College; General Medical Officer, Department of Health, New York.

"Like all of your publications, your recent book entitled 'Tuberculosis A Preventable and Curable Disease,' is notable because of its clearness, directness, and simplicity of style. It seems to me excellent in every respect and is an important and valuable contribution to the propagandum for the treatment and prevention of tuberculosis."

REV. JOHN H. HOLMES, Minister of the Unitarian Church of the Messiah, New York.

"I do not know when I have read a volume of more practical value and one destined to accomplish more good. Packed from cover to cover, with the most important kind of information, it ought to work a miracle in the education of the public."

A. JACOBI, M. D., LL. D., Emeritus Professor of Diseases of Children, Columbia University; Ex-president of the N. Y. Academy of Medicine and of the Association of American Physicians.

"Your new book contains whatever we now know of tuberculosis, its nature, prevention and treatment, in a lucid and popular style. By publishing it you have rendered an important and pleasing service."

THEODORE C. JANEWAY, Ph. B., M. D., Professor of Medicine, Columbia University; Attending Physician, St. Luke's Hospital, New York.

"It seems to me you have put between the covers of your book practically everything of importance for the general practitioner and the intelligent layman, who wishes to take his part in the anti-tuberculosis campaign. For the former your pages—one might almost say sermon—on the Physician's Duty ought to be of the greatest value, if he has not given the subject much thought, in setting before him clearly the great responsibility to other individuals and the community, which rests on everyone who undertakes the treatment of a tuberculous invalid."

JOHN H. LOWMAN, M. D., Professor of Medicine at the Western Reserve University, Cleveland, Ohio.

"The author of this book has the art of putting plain questions plainly and of appealing to the practical sense of a people. That Dr. Knopf has put his heart as well as his mind in his work is shown by the evident sincerity and purpose of his work. The book is an appeal and it cannot fail of its object."

GEORGE M. KOBER, M. D., Professor of Hygiene, University of Georgetown, Washington, D. C.

"Professor Knopf has shown that tuberculosis is a preventable and curable disease—we firmly believe that if the measures recommended by him in his book were generally adopted, the 'great white plague' which now carries off annually over 150,000 victims in the United States alone would be eradicated within one or two generations."

EDWARD O. OTIS, A. B., M. D., Professor of Pulmonary Diseases and Climatology, Tufts Medical College, Boston, Mass.; Visiting Physician to the Massachusetts State Hospital for Consumptives.

"You have not only discussed the whole subject of tuberculosis, but have, as well, considered innumerable social conditions which predispose to the disease as well as their remedy; indeed the book can almost be considered a treatise on healthy living."

W. S. THAYER, A. B., M. D., Professor of Medicine, Johns Hopkins University; Physician to Johns Hopkins Hospital, Baltimore, Md.

"Such a book as this is sure to be of real great value to the public, medical and non-medical. One of its great values, it seems to me, lies in the fact that it is not the compilation, but the authoritative statement of one who has given his life to the study of this subject."

EDWARD L. TRUDEAU, A. M., M. D., Founder and Physician of the Adirondack Cottage Sanatorium, Trudeau, N. Y.; First President of the National Association for the Study and Prevention of Tuberculosis.

"This book has a great field of usefulness in the education, specially of patients, of the public, and of the general practitioner. As an educational factor it will aid greatly the antituberculosis crusade in America, and I congratulate you on the accomplishment of so thorough and useful a work."

EDWARD T. DEVINE, PH. D., LL. D., Professor of Social Economy, Columbia University; General Secretary Charity Organization Society, New York.

"It is a splendid thing that you have found time and that you have had the inclination to write a general brief treatise on tuberculosis. You have contributed so much to the movement for the prevention of this disease on the lecture platform, by your professional activity, and by your participation in organized movements, that there is scarcely any one to whom the movement and the poor consumptive are under greater obligation. The book is worthy of your reputation and will, I am sure, do a vast amount of good."

I have all reason to believe and to hope that this second edition will meet with the success equal to that of the first and thus not fail to fulfil its mission in helping toward the goal which I inscribe in my dedication, The Eradication of the Great White Plague.

S. A. KNOPF.

NEW YORK,
April, 1910.

PREFACE TO FIRST EDITION

In presenting this new volume to the English-speaking public, and to the people of the United States more especially, the author wishes to make clear its objects and aims. The book is intended to be helpful, first, to the patient afflicted with a tuberculous disease, but not with a view of replacing the physician, the direct medical adviser; for no book, not even a scientific treatise, can replace for the patient the experience and judgment of the skilled physician. But it will aid the sufferer by giving him such insight into his affliction as will convince him of the curability of the disease in the earlier stages and the great possibility of improving his condition in the latter stages, providing he places himself under the careful guidance of a physician in his own hygienically arranged home, in a health resort, or in a special institution (sanatorium or hospital).

To the patient and those living with him, the book is intended to teach the most efficacious yet most simple and practical means of preventing the spread of the disease—in other words, to teach

him and those with whom he comes in contact how infecting others can be prevented and he himself can be guarded against reinfection.

Again, to those living and associating with the tuberculous, the book is intended to give the assurance that the clean, conscientious consumptive who is careful in the disposal of his sputum and the prevention of droplet infection, is as safe an individual to associate with as anybody else, and that phthisiophobia (exaggerated fear of the presence of a consumptive) is unjustified, cruel, and inhumane.

To the physician, it is hoped, that the book may be helpful by enabling him to give to his tuberculous patients in detail the necessary instructions concerning their duties to themselves, to their friends and families, to their medical advisers, and to the community in which they may live.

To the physician, nurse, and family of the patient, the descriptions and illustrations of some devices whereby the open air treatment and other hygienic and sanitary installations in the home of the patient can be easily arranged, it is hoped, may likewise be helpful.

To the hygienist and sanitarian, the hints which the book contains concerning the housing problem in its relation to the prevention of tuberculosis may not be amiss.

To municipal and health authorities of cities and towns wherein the compulsory notification of tuberculous cases and the proper control of tuberculosis is not yet inaugurated, a description of such methods as have proved most efficacious will surely be welcome. The book is designed to be helpful to all those interested in this phase of anti-tuberculosis work.

To the city fathers, legislators, and statesmen, it is hoped this little work will show that the abolition of child and sweatshop labor, the regulation of woman labor, proper labor and factory laws in general, and the enactment and enforcement of proper bovine laws are indispensable in the combat of tuberculosis. It will also show that to take care of the tuberculous poor at the right time and right place is wiser than to keep them at the wrong place when it is too late to do them any good; and that by pursuing the policy outlined herein, the community will in the end be the financial gainer, and the sanitary and moral conditions of its citizens will be vastly improved. The author hopes to convince the proper authorities that tuberculosis in prisons, reformatories, and asylums should be combated by the examination, segregation, and treatment of those ill with the disease.

To the employer of men and women, the factory owner, the farmer, and even to people employing

only servants, the book is intended to show that by proper sanitation of workshops, stores, factories, and sleeping quarters, and by looking after the health of working people in general, a vast amount of good can be done and the solution of the tuberculosis problem greatly advanced.

To the public press, to professors of colleges, to teachers of public and private schools, and educators in general, the book is intended to point out the part they have to play in the combat of tuberculosis as a disease of the masses.

To the clergy, philanthropists, charitable individuals, and charity organizations, it is hoped to give some valuable hints concerning the best way to come to the aid of the consumptive poor without pauperizing them. Philanthropists willing to aid the anti-tuberculosis cause, will be shown many ways in which they can serve their creator by serving their fellow-men.

Even people of moderate means who are willing to help in the cause of consumptives may learn how they can be most useful.

The people living in neighborhoods where sanatoria exist, or are projected, it is hoped will be convinced by the carefully gathered statistics that such institutions are not a sanitary or economic danger to the neighborhood, but that on the contrary the hygienic conditions of places

where sanatoria are situated have usually improved after the establishment of such institutions, and the economic prosperity of the community has correspondingly increased. To fraternal organizations, mutual benefit associations, and life insurance companies, the author hopes to show the great service such bodies can render in the solution of the tuberculosis problem.

To the people at large, this volume is intended to show that tuberculosis is a preventable and curable disease, rarely directly hereditary; and that in children of tuberculous parentage, the hereditary predisposition can be overcome if they are properly raised, and their physique, particularly the chest, well developed. Even a predisposition acquired after birth or later in adult life can be successfully combated by similar means and by careful, sober, and hygienic modes of life.

By reading the following pages, it is hoped the layman may learn that a sober, proper, and regular mode of living is all that is necessary to overcome a hereditary predisposition or an acquired tendency to the disease, and learn also what he is to do and what not to do if he wishes never to fall a victim to tuberculosis. By pointing out the early symptoms that may be easily recognized by a layman, it is hoped to induce the individual having such symptoms to place himself under the care of a

physician immediately, while he is still in the most curable stage of the disease, and thus be restored promptly to health and strength. In short, it is hoped that the knowledge which this book is intended to impart will help to solve the tuberculosis problem and bring us nearer to the time when the great white plague shall be forever eradicated from our midst.

S. A. KNOPF.

NEW YORK,
May, 1909.

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TUBERCULOSIS

CHAPTER I

WHAT A TUBERCULOUS PATIENT SHOULD KNOW OF HIS DISEASE

Knowledge is power, and in no disease is the knowledge of his condition more essential for the well-being of the patient, nor is there any in which the patient can by this knowledge help the physician more toward obtaining a complete and lasting recovery than in the disease known as tuberculosis pulmonum, phthisis pulmonalis, pulmonary tuberculosis, or consumption.

The tuberculous patient should know that he is afflicted with a chronic, infectious, communicable, preventable, and curable disease. The disease being of a chronic character, that is to say long lasting, the patient must not expect to get well within a few weeks. It may take months and sometimes even years for a complete recovery. Fortunately, in many cases the treatment can be continued later on while the patient may be able to do some work at the same time.

The tuberculous patient must, on account of the nature of his disease, be exceedingly careful not to infect others or reinfect himself. Perhaps the most frequent cause of infection is the careless disposal of sputum or spittle containing the germs of tuberculosis which can be transmitted or communicated from man to man, from beast to man, and from man to beast. It must be remembered that the germ of tuberculosis, called bacillus tuberculosis and discovered by Professor Robert Koch in 1882 (*Frontispiece*), is the only direct cause of all tuberculous diseases, and that without the presence of this bacillus the development of tuberculosis is impossible. Koch called this germ "bacillus," which is the Latin for rod, because under a powerful microscope, when subjected to a certain red coloring agent, these minute forms appear like little rods. (Fig. 2.) When these germs enter any living organism they are apt to multiply and by irritation cause the growth of small elevations about the size of the head of a pin, called tubercles, hence the name tuberculosis.

The bacilli may be found in countless numbers in the lung or any other organ affected with tuberculosis, and in the case of pulmonary consumption quantities of them are rejected when the patient expectorates. The bacillus or germ of tuberculosis is a little parasite, a fungus or mush-

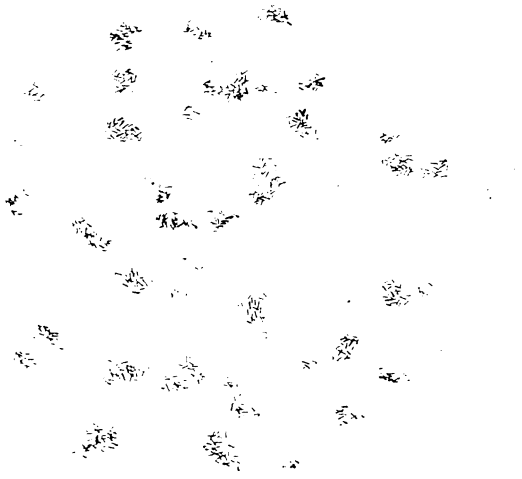

FIG. 2. A small particle of Sputum seen through the Microscope. The Red marks represent the Tuberculosis Germs 1200 times enlarged.

room, belonging to the lowest scale of vegetable life. It not only gradually destroys the lung substance through ulcerative processes, but gives off at the same time certain poisonous substances called toxins which are often the cause of serious symptoms.

The manner in which the infection from man to man occurs most readily is by the inhalation of bacilli-laden dust. If, for example, a patient expectorates on a floor or a wall where the sputum has a chance to dry and become pulverized, it is liable to float with the dust in the air, and any predisposed individual breathing this air is in danger of contracting the disease by inhalation.

Another way in which infection may take place is from close contact with tuberculous individuals who are not only careless with the disposal of their expectoration, but also careless when coughing. It is erroneous to suppose that the patient who coughs but does not expectorate is therefore harmless. He is only harmless when he takes care always to hold his hand or handkerchief before his mouth so as to prevent the expulsion of small particles of saliva during coughing. These small particles or little drops of saliva may contain the bacilli and, when taken into the system of a predisposed individual by inhalation or ingestion, may cause a tuberculous infection. This

manner of communicating the disease from one person to another is called droplet infection.

The next most frequent way in which tuberculosis may be transmitted to man is through the digestive system. Tuberculous meat or milk can give tuberculosis and, according to some authorities, infection from the ingestion of tuberculous milk is quite frequent.

Inoculation, that is to say, the penetration of tuberculous substance through a lacerated skin or any other kind of a wound, is most likely to happen when proper care is not taken in cleaning cuspidors which have been used by consumptives. If the cuspidor is of glass or porcelain and should be nicked or chipped, the wound and the inoculation may occur at the same time. Occasionally, physicians, students of medicine, or veterinary science become inoculated with tuberculosis by wounding themselves with instruments which had been soiled with tuberculous matter.

Formidable as these multiple dangers of infection and reinfection appear, it should be said right here that all that is necessary to avoid them is to be careful, conscientious, and faithful. The patient who is up and about should always expectorate into a cuspidor partially filled with water. The cuspidor should have a cover and it should have an opening large enough for the individual

using it to have no difficulty in depositing his spittle in the interior of the receptacle, so that he will not soil the brim on which the tuberculous matter would have a chance to dry and become a source of infection. (Figs. 3, 4, 5, 6.) The tuberculous patient when outside of his home, should, of course, be as religiously careful with his sputum as within it. When he can not conveniently expectorate in the usual type of cuspidor, he should not let this serve as an excuse for careless expectorating and the dissemination of his disease. He should always provide himself with a sputum flask either of metal (Figs. 7, 8) or glass (Fig. 9), or a pasteboard box (Fig. 10), or purse (Fig. 11), which he can carry in his pocket. For the patient in bed, a metallic frame (Fig. 12) containing a box made of impermeable pasteboard (Fig. 13), or a box made entirely of pasteboard (Fig. 14), may serve as a convenient sputum

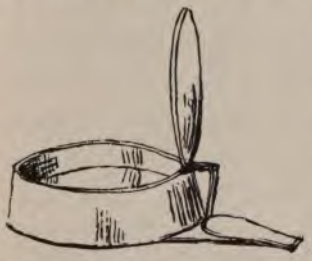

FIG. 3. Knopf's cuspidor of metal. It has a large opening and the cover is to be manipulated by the foot. To avoid spattering it should be partially filled with wet sawdust.

FIG. 4. The Same When Closed.

receptacle. The contents (sputum) of the pocket flasks should be poured into the water-closet and the vessels afterwards cleaned with hot water. The pasteboard receptacles may be thrown into the fire with their contents.

FIG. 5. Sanitary Elevated Cuspidor of Gold-bronzed Metal. When in Use.

It is conceivable and pardonable that, when in public, patients should not desire to make use of a pocket flask or purse which would attract attention to their malady. The only thing such patients can do is to use squares of soft muslin, cheese cloth, cheap handkerchiefs, or Japanese paper handkerchiefs especially manufactured for that purpose, which can be burned after use. They should also place in the pocket in which they intend to put the soiled cloths a removable lining of rubber or other impermeable material which can be thoroughly cleaned. This additional

lining could be fastened to the inside of the ordinary pocket by clamps, and would thus be of no inconvenience to the patient. A pouch of vulcanized rubber or an Oriental tobacco pouch may be used in place of the extra pocket or lining. In any case it is well to have more than one of these pockets or pouches so that the patient need never be without one while the other is being cleaned and immersed in some disinfectant or in boiling water. Ladies should divide their little handbags or satchels into two compartments; one for the clean and one for the soiled cloths. Of course, all invalids who use handkerchiefs, rags, or Japanese paper as receptacles for expectoration, are in danger of infecting their hands, which they should always wash thoroughly before touching food. To expectorate in a handkerchief and use the same for wiping the nose exposes the patient to reinfection.

FIG. 6. Sanitary Elevated Cuspidor When Closed.

FIG. 7. Knopf's oval nickel-plated irreversible flask for pocket use, with removable funnel that can be manipulated with one hand.

It should also be remembered that the house-fly

and other insects are often the carriers of tuberculous infection, and a vessel of any kind intended to receive tuberculous sputum should not be without a cover. The fly, for example, may not only carry small particles of tuberculous sputum on its feet and then deposit them on some article of food; but it has been demonstrated that even the dead fly which had fed on tuberculous substances is dangerous, for the tubercle bacilli have been found in the dust coming from the crumbled bodies of dead flies.

FIG. 8. Metal sputum flask in use in the U. S. Marine Hospital Service.

A tuberculous patient should be careful not to kiss any one, particularly not on the mouth. He should have his own room if it is at all possible, but always his own bed. If there must be more than one bed in the room, they should be a little more than three feet apart to avoid direct droplet infection. The droplets expelled during the cough rarely go further than three feet and then fall to the ground, where they are less likely to do harm than when directly coughed into a person's face or on to one's cloth-

FIG. 9. Dettweiler's pocket sputum flask of thick blue glass, with metal mountings.

ing. The patient should remember always to hold his hand or handkerchief before his mouth when coughing.

The physician treating the patient will, of course, prescribe for the cough when necessary; but he will also tell the invalid that he must control useless coughing; in other words, he should never cough unless he feels that he has to expectorate. The patient should understand that to cough without expectorating is yielding to an irritation of the throat which may in time become a habit rather than a necessity. A strong will can control the useless cough, or the cough of habit. If the patient will consider it as impolite to cough uselessly, particularly in presence of others, just because he has a little tickling in the throat, as it is impolite to scratch one's head in public because of a little itching, he will be greatly helped in his efforts. The other thought in disciplining the cough should be that useless coughing is in-

FIG. 10. Kny-Scheerer Sanitas cup for pocket use made of tin with a removable pasteboard container.

FIG. 11. Johnson & Johnson's Pasteboard Purse for Sputum.

jurious to the throat and involves an unnecessary expenditure of force.

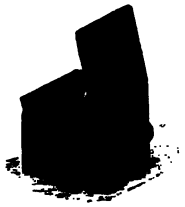

FIG. 12. Seabury & Johnson's Metallic Frame for Pasteboard Sputum Cup.

Besides these special hygienic measures which the patient should carry out, there is, of course, also the very important general and personal hygiene. He should keep his skin in good condition by weekly baths and daily sponges. Beard and mustache should not be worn at all, or be closely cut. As underwear the linen-mesh, heavy weight in winter and light weight in summer, is to be highly recommended. If, as happens in some cases, the patient feels cold even with the heavy weight linen-mesh, it is advisable for him to wear linen-mesh next to the skin and an additional cotton, silk, or very light woolen garment over it. Linen-mesh underwear is more suitable for the tuberculous because it dries quickly when the patient perspires. It produces a constant pleasant friction on the skin, and is preferable to wool or cotton in that the mesh allows a better ventilation of the skin and renders the patient less apt to catch cold. The out-

FIG. 13. Pasteboard Container to Seabury & Johnson's Cup.

side garments should be comfortable and according to the season, light in summer, warm in winter; but not too heavy so as to hinder free movement. All garments restricting free thoracic or abdominal breathing should be done away with. The high collar for men and the high, tight, stiff, or boned collar for women, or anything else constricting the neck is injurious; so is the tightly laced corset and tight belt. Ladies' skirts should be partially suspended from the shoulders and the steel corset should, whenever possible, be replaced by a comfortable waist.

FIG. 14. Sanitary Spit-cup Made of Pressed Pasteboard with Cover and Handle.

With everything relating to his personal hygiene, to the prevention of infection of others and reinfection of himself, the patient should be familiar. But he should also know that if he is careful and obeys the few necessary rules, people need not be afraid but should gladly associate with him. He, himself, because of his knowledge and the consciousness of doing his duty, will be happier and freer in mind. He can demonstrate that although tuberculosis is a communicable disease, it is by no means to be classed with the highly contagious diseases (the word "contagion" comes from the Latin *contingere*, to touch), such as small-

pox for example. The touch of the clean, conscientious consumptive can not give tuberculosis.

Another fact which should tend to cheer the tuberculous patient, is that of all the chronic diseases his is curable the most frequently. It is not only true that as many as 80 per cent of cures are reported when the patient's disease was discovered in time and properly treated, but the post-mortem examinations of hundreds and hundreds of cases which died from accident or other diseases than consumption have shown the scars of a healed tuberculosis. It must be assumed that in these cases they had had, at one time or another, a little tuberculosis and that they recovered perhaps without ever having known that they had the disease. All this should be ample proof of the curability of tuberculosis, and the consumptive should be hopeful and cheerful. If he is in the earlier stages of the disease and submits himself to proper and timely treatment, he may be reasonably certain of an absolute recovery. If he has passed the earlier stages, he may still be much improved and live a long time in comfort with his earning capacity reëstablished.

However, the one most important thing the tuberculous patient should know of his disease is that unless he follows the instructions of his physician to the letter and has implicit confidence

and trust in him, it will be difficult to accomplish a cure.

In no disease is it so essential to attend to minor details in the matter of sleeping quarters, of dress, use of bath (cold or warm), exercise and rest, food, and medicine, as in tuberculosis. The implicit obedience to the physician's orders, the performance with religious punctuality of all the hygienic, dietetic, and other directions, are essential and important for a patient in no matter what stage of the disease. It can not be emphasized too much that the medical guidance and supervision are of paramount importance to the patient whether he is in his own home, in a health resort, or in a sanatorium, and no matter in what climate he may live. The patient should not be sensitive about any of the precautions necessary to prevent the spread of the disease, but should take an interest in helping those about him carry them out to the most minute detail.

CHAPTER II

WHAT THOSE LIVING WITH PATIENTS SHOULD KNOW CONCERNING THE DISEASE

Those living with the tuberculous patient should know first all that the patient ought to know, that is to say, what has been outlined in the preceding chapter; but it will also be their duty to insist with kindness but firmness, as long as the patient is able to do so, on his carrying out absolutely the precautions necessary to limit the danger of infection to the smallest possible degree. If he is not able, they must do it for him. Indulgence is out of place in tuberculosis. It should be impressed again and again upon the heedless patient that his carelessness not only means danger to others but also danger to himself by the possibility of reinfection. It should be explained to him that the inhalation of the bacilli which he has rejected is as dangerous to him as to others.

When the patient is in the latter stages of the disease and so helpless that he can not always make use even of a light pasteboard (Fig. 14) or aluminum hand spittoon, he should be provided

with moist cloths, kept within easy reach, into which he should expectorate. These cloths should in turn, while still moist, be wrapped up in paper and then burned. They should be handled as little as possible if the tuberculous sputum upon them should have become dry.

When the patient and those living with him do their duty, there is no danger of contracting the disease; in fact, for the strong and well the occasional inhalation of a few bacilli, the occasional ingestion of tuberculous meat or milk is, after all, not so dangerous. There exist powerful means of natural defense against tuberculosis in the healthy human being. The tubercle bacilli which may be inhaled are taken in with the dust. This dust is arrested by countless fine hairs in the nasal cavities and during the act of blowing the nose this bacilli-laden dust is usually expelled with some of the nasal mucus. When, as it may happen, some bacilli are not caught up by the fine hairs, the very secretions of the nasal membranes being bactericidal, that is to say, having germ-killing properties, can render the bacilli harmless. Even if the germs should have passed these two barriers and have entered the deeper respiratory tracts—the bronchial tubes—these in turn are lined with cilia, very fine hair-like organs which are in constant motion, and which expel

foreign bodies with the mucus that the bronchial tubes secrete. Lastly, even should the bacilli enter the lung tissue itself, there again they will meet the white blood corpuscles, and if the latter are plentiful and in good condition they will overcome the enemy—the bacilli—by swallowing them. The great French scientist, Metchnikoff, called this method of natural defense of the blood "phagocytosis," from Greek words meaning a cell which eats, indicating thereby that the white blood corpuscles devour the bacilli.

One thing that is important for those who are living with the tuberculous to know is that while it is a rare occurrence for a child to come into the world with a tuberculous lesion, the child of a tuberculous father or mother very often inherits a certain physiological poverty which is called a predisposition. In other words, while all the organs may be perfectly normal, the child brings with it as an inheritance from a sick parent, a weak constitution with little resisting power to tuberculosis and other diseases. When now the offspring of tuberculous parents is, in addition to its weakened condition, exposed to the infection of tuberculosis, its chances to contract the disease are certainly very great.

A child should never be put to the breast of a tuberculous mother. Not only may the child

become infected by the milk, but to nurse it is also too great a drain on the mother's constitution. While the woman during her pregnancy may seem very much better, unfortunately her condition after childbirth is usually worse, and it would be most unwise to have her nurse her child even were there no danger of direct infection from the mother's milk. Such a child should have a healthy wet nurse or be fed artificially with the best and purest milk obtainable. If there is any doubt as to the purity of the milk, pasteurization or sterilization should be resorted to.

Sterilization is usually accomplished by keeping the milk at the boiling point (212° F.) for half an hour.

Pasteurization is the process of heating the milk to a temperature between 140° and 176° F. for fifteen or twenty minutes. This is sufficient to destroy the tubercle bacilli and most of the ordinary milk germs without cooking the milk, which is generally considered to render it less nutritive and digestible. Even pasteurization deteriorates the milk, therefore every effort should be made to obtain it pure and fresh. Whether the milk comes directly from the healthy cow, or is pasteurized or sterilized, it should be cooled quickly and kept cold and covered until it is to be used.

The closer the contact in which the tuberculous

mother and child live, the greater is the danger of infection. If the mother kisses the child on the mouth or puts the nipple of the milk bottle or the spoon with which it is fed into her own mouth to taste the milk in order to judge of its temperature or sweetness before giving it to the child, it is evident that infection can take place very readily. If the mother coughs when carrying the child in her arms, the little drops expelled during the cough may reach the child's mouth or it may inhale these bacilliferous droplets. If the tuberculous mother or those living with her will see that the simple necessary precautions to avoid these postnatal infections (infection after the child's birth), are carried out, there will be an excellent chance for the child to grow up without becoming infected. Such a child should also be treated for its inherited predisposition, that is to say, it should have plenty of fresh air, proper hygiene, and care in general; in fact, all hygienic measures tending to make it strong and resistant to disease should be inaugurated at the earliest possible moment.

For the further protection of those living with the patient we would strongly advise that the soiled personal and bed linen, sheets, pillow-cases, underwear, napkins, handkerchiefs, etc., of a consumptive be handled as little as possible when dry. Immediately after removal from bed or body,

the soiled linen should be placed in water and be washed separately or boiled before being put in with the general laundry. Cleaning the room should never be done with a feather duster or broom. If, on account of a fixed carpet, sweeping is inevitable, let it be preceded by throwing moist sawdust or moistened bits of paper on the floor to allay the dust. It is well also while sweeping to lower the windows from the top and keep them closed at the bottom. The woodwork and furniture should be wiped with a moist or slightly oily cloth according to the nature of the surface. Whenever possible, the cleaning should be done by the pneumatic exhaustive or vacuum process. This is the ideal method of cleaning the apartment of the sick. There are portable devices now in the market which can be procured at reasonable rates and thus the consumptive poor may be able to avail themselves of this hygienic mode of removing dust.

It is necessary to remember that when table utensils, such as drinking cups and glasses, forks, spoons, etc., which come in direct contact with the mouth, have been used by a consumptive, they should never be used by any other person before they have been thoroughly washed with soap and hot water or placed in boiling water for a few moments. No one else, of course, should use the

patient's napkin. If he cannot have a clean one at every meal, it is well to keep it in some sort of an impermeable case, or even a cover of washable material so that it need not be handled unnecessarily.

With the training which teaches the invalid when and when not to cough, of which we spoke when discussing what the patient should know of his disease, a tuberculous invalid can be a very agreeable companion at the table. To ask an honest, conscientious, and well-trained consumptive to take his meal separately is as unkind and unnecessary as can possibly be, and certainly, if insisted upon, it is enough to make the consumptive patient thoroughly unhappy.

It should be the privilege of those living with the tuberculous patient to make him as happy, as cheerful, and as hopeful as possible. Happy surroundings, a cheerful face, a hopeful word for the invalid from those about him will be no little factor in accomplishing his cure.

Phthisiophobia, that is to say, the exaggerated fear of contracting phthisis or consumption, is entirely out of place when the patient is conscientious and careful. It is not only out of place, but it is cruel. Some people in their fear and prejudice go so far as not only to consider the consumptive a physical danger but also as mentally peculiar or something worse. Phthisiophobia

resembles an epidemic disease which now and then crops up in different localities. That there is no danger from the clean conscientious consumptive has often been sufficiently demonstrated, and to think him differently constituted mentally from well persons or people afflicted with other physical ailments is quite absurd.

Not so very long ago a young physician startled the medical and lay press by making the statement that the average consumptive is afflicted with mental and moral aberration. He made the totally unwarranted assertion that in the typical consumptive psychasthenia, the loss of self-control and the rise of brute selfishness combine to distort the clearness of his ethical perception. I replied to this statement at the time in an address before the Society of Medical Jurisprudence, entitled "A Plea for Justice to the Consumptive." To strengthen the force of my own experience, I had collected the opinions of twelve of the leading authorities of this country on tuberculosis and mental diseases, and all of them agreed with me on the injustice of making the statement above referred to.

It would take too much space here to give all the valuable letters and expressions of opinion received at the time from such men as Professors Hermann M. Biggs of New York, S. G. Bonney of Denver,

Vincent Y. Bowditch of Boston, E. D. Fisher of New York, A. Jacobi of New York, Edward G. Janeway of New York, Arnold C. Klebs of Chicago, William Osler of Oxford, England, Edward O. Otis of Boston, E. L. Trudeau of Saranac Lake, James Tyson of Philadelphia, and Dr. J. B. Ransom, Prison Physician of Elmira, N. Y. I will, however, reproduce the opinions of three men who may justly be said to be leaders in the scientific medicine of the English-speaking world. Professor Edward G. Janeway, Dean of the Medical Faculty of Bellevue and New York University, wrote me: "I have not noticed any such tendency as you inquire about on the part of consumptives as regards immorality or crime as compared with well people or with those ill with other diseases, placed under similar circumstances. It is to be remembered that criminals and the insane are prone to be victims of tuberculosis, and hence someone who studied this class of people would be liable to form very unjust views about the consumptive class as a whole. Nor is it my experience that the average consumptive is inclined to brute selfishness, loss of self-control, and hence distortion of the clearness of ethical perception. I have found so much to the contrary that I am surprised at so broad a charge against the consumptive invalid."

Dr. William Osler, Regius Professor of Medicine of Oxford, England, wrote: "I quite sympathize with you in your movement, and in reply to your question I would say, first, I have never noticed among consumptives any greater tendency to immorality or crime than in other individuals; I should rather say the contrary. My impression is that the unfortunate victims of tuberculosis are above the average in their mental and moral character; secondly, I should say emphatically that the average consumptive is neither inclined to brute selfishness nor any special distortion of the ethical perceptions. I am glad you called my attention to the article in the 'New York Medical Journal.' So far as my experience goes, such statements as you say are made therein are an unwarranted slander."

The last letter comes from a man to whom all who know him personally, or know his works, look up, not only as a great physician, scientist, and specialist on tuberculosis and the pioneer of the sanatorium treatment in this country, but also as a great humanitarian and a most noble character. He is an example of what a man, though consumptive himself, can do for his fellow-men. Dr. Edward L. Trudeau, who twenty-five years ago as a seemingly hopeless invalid, made his home in the wilderness of the Adirondack Mountains,

became through his untiring work, his unselfish devotion to science and the highest ideals of human helpfulness, the founder of one of the most beautiful and flourishing sanatoria for the consumptive poor in the world, the founder of a prosperous village crowded with consumptives of the wealthier classes, a teacher to the medical profession of practical phthisiotherapeutics, and a teacher of practical philanthropy to the American public and the world at large. These are his words:

"I have never noticed any greater tendency to immorality or crime among consumptives than is to be found in the average of the human race, as far as it has come under my observation. On the contrary, I have seen all the finer traits of human nature developed to the fullest extent by the burdens which chronic and fatal illness, often slow in its progress, adds to the sum total of what men and women usually have to endure in life. I have seen certainly more patience, courage, self-denial, and unselfish devotion to others in consumptives than I have noticed in the majority of healthy human beings. Indeed, the sanatorium work never could have been carried on were it not for the self-sacrificing devotion to the suffering of others shown by my associates, the nurses, and even the employees at the sanatorium, most of them having come here originally because suffer-

ing from tuberculous disease. History is full of instances which prove that tuberculosis does not interfere with the development to the highest degree of the intellectual, the moral, or the ethical sides of man's nature."

It would hardly seem necessary after quoting the opinions of these three distinguished authorities to add my own opinion, though based upon an experience of many years of practice among consumptives in different climes and different countries, among men and women in all stations of life. I may say that I have not only practiced but also lived among them and with them, and from all my experience I can only confirm what has been said by the three great physicians just mentioned. Never have I noticed consumptives to be more inclined to immorality than individuals afflicted with other diseases, or even well people; only in a few instances have I noticed real selfishness, and never what one could call a distortion of the clearness of ethical perception, among them. On the contrary, as in the experience of Drs. Osler, Janeway, and Trudeau, it has always seemed to me that many consumptives are above the average in their mental and moral characteristics. Instead of selfishness, I have frequently witnessed the most touching evidence of self-sacrifice and devotion. I have seen colleagues

in institutional and private practice, trained nurses and sisters of charity, who, though they knew they had contracted tuberculosis in the pursuit of their professional duties, did not leave the battlefield, but continued to labor and help their consumptive fellow-sufferers. Two of my most beloved teachers, to whom I owe an everlasting debt of gratitude for the inspiration and help they have given me in my work, Professor Grancher of Paris and Geheimrath Dettweiler of Falkenstein, were both consumptive. They taught and practiced among consumptives for a quarter of a century, and remained leaders in the anti-tuberculosis crusade until the end of their most useful lives.

CHAPTER III

THE DUTIES OF THE PHYSICIAN TOWARDS HIS PATIENT, THE FAMILY OF THE PATIENT, THE COMMUNITY HE LIVES IN, AND OTHER COMMUNITIES

The duties of the family physician in regard to the tuberculosis problem are manifold. We will begin by the discussion of his duty towards the patient. The first question to arise, if the careful examination of an intelligent patient has shown him to be tuberculous, is, should the physician tell or not tell this fact to the patient? I believe it to be his sacred duty to inform an adult patient of the true character of the disease and also to inform the family of the situation. To hide from the intelligent adult the fact that he is tuberculous or that a member of his family is afflicted with the disease, is, in the light of our modern knowledge, an absolute wrong; or it may even be called a criminal neglect. That the family physician will use the utmost tact in revealing such a condition to the patient or to the friends of the patient is a matter self-understood. What we know to-day

of the curability of an early tuberculosis makes the task all the more easy. One can inspire the patient and his friends with the hope of absolute recovery when in the presence of an early tuberculosis.

In order to overcome the shock which the revelation of the presence of the disease at times causes the patient, it has been my practice to say to him, "Be grateful for this early discovery of a curable condition, which, when overcome, may leave you a stronger and more vigorous man than you ever were before."

After having inspired the patient with hope and gained his complete confidence, the next duty of the physician is naturally to tell the patient what he should know of his disease; in other words, to impart to him such knowledge and information as it has been our endeavor to give in the first chapter.

While it is desirable that the physician should have leaflets of instructions ready to hand to the patient for careful perusal, the spoken word, the verbal instruction must not be neglected. Whatever literature the physician may give to his patient, it should always be supplemented by a few words of explanation.

All preventive measures intended to protect those living and associating with a consumptive

from infection and himself from reinfection, should be inaugurated at once. It is sometimes difficult to make the necessary installation for the home treatment. It is not wise nor judicious to put a family of moderate means to the expense of building porches for outdoor sleeping, of changing domicile, of buying window-tents, reclining chairs and other paraphernalia when it is in the interest of the patient and of his family that he should be sent to a sanatorium, hospital, or health resort.

Whether it is best for the patient to go to an institution, sanatorium, or hospital, to make a climatic change or to remain at home, will depend upon the financial and other circumstances of the family, upon the patient's character, his peculiarities and above all, upon his condition. A competent physician will know when a change of climate is desirable, feasible, or immaterial. He will bear in mind the patient's peculiarities and recall that patients much attached to home life are apt to suffer from nostalgia (homesickness) when sent away, and because of depression and loneliness do badly under those circumstances. The homesick patient eats little and in his despondent moods is very apt to forget to follow the directions about outdoor life, breathing, walking, careful exercise, etc., so essential to his well-being. On account of this peculiarity, some patients do

better at home even in a less congenial climate, because they are happy and contented there and willing to obey all the necessary hygienic and dietetic directions. The physician will also recognize the class of patients who must go away and should be in some special institution because at home they will not obey the instructions so essential to increase their chances of recovery. Some patients for whom a climatic change is desirable may do well in a health resort under the guidance of a physician.

If the patient is to remain at home, it is, of course, presumed that the home is so situated that all the preventive and curative measures essential to the treatment can be carried out. Since experience has shown that the sanatorium method of healing tuberculous patients is the best, we will in the following chapter describe how this treatment may be adapted to and imitated in the homes of the well-to-do or the poor. There are, of course, instances when the physician may be in the presence of an advanced case for which a change of climate may be useless, and for people in moderate circumstances the sacrifice of sending a patient away may mean a good deal. This the conscientious physician will take into consideration.

If it is possible for a family in which tubercu-

losis has appeared to leave the large overcrowded city for a healthful country district, or even less congested portions of the city, where they will be able to support themselves just as well and have in addition greater comfort, purer air, and more outdoor life, it is the physician's duty to urge such a change.

Not all physicians can be expected to be thoroughly familiar with the climatic conditions of the various parts of the country, therefore the following maxims for the selection of climate in pulmonary, laryngeal, and bone tuberculosis may be helpful. These maxims I presented at the occasion of a discussion on climate in the treatment of tuberculosis before the Clinical and Climatological Section of the National Association for the Study and Prevention of Tuberculosis, at the second annual meeting in Washington, May 18, 1906. They are the result of long experience, and have guided me in years of practice among the tuberculous whenever I was called upon to decide or advise on a climatic change for a patient.

(1) To deny the beneficial influence of certain climatic regions as a valuable adjuvant in the treatment of tuberculosis is as dangerous and unscientific as the belief in the specific curative quality of any particular climate.

(2) A change of climate, though not necessarily a marked one, except in the very latter stages of the disease if of either a pulmonary or laryngeal character, is nearly always good. While a change from an unfavorable climate to a favorable one, or from a good to a better, must naturally be considered preferable, this rule is by no means inflexible. When the patient has contracted tuberculosis in a favorable climate, a change to another, even to a seemingly less favorable one, may accomplish as much good for this invalid as the reverse in others.

(3) The native locality of the tuberculous must be taken into consideration when making a climatic change. The patient who spent his early youth in Norway or other parts of northern Europe, or one born in Massachusetts, Maine, or northern New York where the winters are rigorous, will usually do better in such climates as Colorado, the Adirondacks, Sullivan or Orange counties of New York offer. The sons and daughters of sunny Italy and Americans born in the warmer zones, will do better in climates such as are to be found in southern California, New Mexico, Arizona, North and South Carolina, Virginia, Florida, Bermuda, etc.

(4) To the foregoing rule there are exceptions, and besides considerations of nativity one should

be guided in a large measure by the patient's personal experience. For example, a cold climate may be selected if the patient has found that he feels more comfortable and less distressed in winter. A change to a warmer climate is indicated when the reverse is the case. When the experience of the patient has demonstrated that he felt better when near the seacoast, or vice versa, this factor must also serve as an indication for his domicile while seeking cure.

(5) There exist idiosyncrasies in regard to climatotherapeutics and ærotherapeutics (a peculiar constitutional disposition or susceptibility) as there exist in hydrotherapeutics, electrotherapeutics, and medicinal therapeutics. These idiosyncrasies cannot be discovered beforehand, they can only be learned by experience.

(6) High (above 3,000 feet), moderately high (1,500 to 3,000 feet), and low altitudes, hot and cold regions, seacoast, and ocean climates, prolonged voyages, and life on house boats, on rivers and lakes, extreme dryness and moisture have all proved advantageous conditions in numbers of cases.

(7) The value of any climate to a tuberculous patient can not be determined by or compared with any other, unless the patient lives under careful medical guidance in a sanatorium or

private home, and follows the best hygienic and dietetic treatment.

(8) Laryngeal cases (tuberculosis of throat), in the earlier stages with relatively little pulmonary involvement, are often benefited by a change to a moderately high or to a warm moist climate with between 500 and 1,500 feet of altitude, particularly when there is a chronic feeling of dryness in the throat. When there is a tendency to moist catarrh, even very dry and hot climates, provided dust storms are not frequent, are often beneficial. In pulmonary cases a weak heart, distinctive heart or kidney lesions, emphysema, constant fever, and extreme nervousness are contra-indications to high altitudes. Whenever such pathological conditions do not exist, high altitudes, and cold or cool, or hot and dry regions, if dust free, will always prove a valuable adjuvant in the treatment of tuberculosis. Early pulmonary hemorrhage per se need not be considered in determining a choice of climate. However, as a rule, and particularly in cases inclined to frequent hæmoptysis (spitting of blood), long journeys should be made with frequent rests and high altitudes approached gradually. Not a few cases with slight bronchial symptoms (bronchitis), but with weak hearts and evidences of mixed infection do well at the seacoast for the greater part of the year. Prolonged ocean

voyages may also prove beneficial in such cases. The patient, however, must not be subject to sea-sickness, must be fond of the ocean, and be in a situation to travel in comfort and with ease, on a steamer or large ship which has a medical officer on board.

(9) The ideal climate for the average pulmonary patient in the earlier and more hopeful stages of the disease, is one where the extremes of temperature are not great, with a pure atmosphere, relatively little humidity, much sunshine, and all conditions which permit the patient to live comfortably out of doors the largest number of days out of the year, and the largest number of hours out of the twenty-four. For tuberculosis of the bones and joints and scrofulous affections of childhood, the seacoast climates in our temperate zones come nearer to deserving the term *specific* than anything else. The peculiarly beneficial influence of seacoast climate in glandular, bone, and joint tuberculosis is doubtlessly to be ascribed to the aseptic and ozonic quality of the air, and the iodides and other salts suspended therein. But pure air and outdoor life, in whatever locality, can and should be utilized in the treatment of tuberculosis and of scrofulous affections of children. Very anæmic pulmonary cases with dry catarrhal symptoms of the upper respiratory tract

often do well in the warmer seacoast climates. The colder seacoast climates are perhaps only suited for tuberculous patients when they are fairly robust.

(10) In the choice of locality for a climatic change for any patient, besides the pathological considerations enumerated in paragraph 8, many factors must be taken into account. These are:

(*a*) If the patient wishes to return to his former home after improvement or restoration to health, may he do so safely or not? Experience has shown that when great climatic changes have been made, patients frequently have relapsed on returning to their former home.

(*b*) If the patient is married or single, young or old, willing or unwilling to leave; if the patient is subject to nostalgia, and generally much attached to home environments, sending him far away, particularly if against his wish, may produce disastrous results, for mental depression aggravates pathological conditions and retards recovery.

(*c*) If the patient is sanguine and cheerful he will usually do well even at long distances from home, in isolated regions, within or outside of a sanatorium.

(*d*) For the morose and hypochondriac patient, isolation or long distances away from home have often produced the same results as nostalgia.

(*e*) To remove an advanced and evidently hopeless case from his home to a long distance is as cruel as it is unscientific, unless it is done by the patient's special request and with the likelihood of lessening his sufferings and making him happier in general. Slight climatic changes with short distances to travel are often beneficial in such far advanced cases when the patient is perfectly willing to go.

(*f*) The patient's financial condition must be such, that by his removal to distant localities and his subjecting himself to the hygienic and dietetic treatment in special institutions or health resorts, he will not become destitute and a burden to the community which has extended its hospitality to him. His means should be sufficient to avoid all possible anxiety and worry in this regard.

(11) When the situation is such that the choice of home climate or home treatment must be taken into consideration, we should bear in mind the following: The patient will do better in the outskirts of the city than in the city proper; better in the higher parts of the locality than in the lower; better in a clear or relatively clear, dustless atmosphere than in a dusty one; better in a pure, smokeless or relatively clear and smokeless locality, than in one full of smoke and odors; better in a locality where he may get the benefit of whatever

sunshine there is than in a valley, cañon, or narrow street surrounded by high buildings; better where there are few houses than many; better where there are relatively few people than where there is overcrowding; better where there is little traffic and little noise than the reverse.

(12) Lastly, we must consider that the majority of consumptives are recruited from the laboring classes and those we must cure in the same or nearly the same climate in which they will have to live and labor after their restoration to health. While the cure of the consumptive individual in his home climate, which is in most instances far from the ideal, may often necessitate a longer space of time, in the end there is an advantage in this. Experience has demonstrated that relapses among this class of patients are fewer, and the cures more assured and lasting than those obtained in more congenial climates.

The duties of the physician toward the family of the patient are as important as those to the patient. In a family where there is a consumptive, every member should be examined and periodically reëxamined for tuberculosis, that is to say, their chests should be gone over carefully every three to six months. The discovery of cases of tuberculosis in the very incipient stages will naturally be much more frequent if this is done than is

usually the case. As is well known, the earlier a case of tuberculosis is discovered the greater are the chances for cure, if timely and judicious treatment is given.

For the practitioner who is not the family physician, but is called in to take care of a consumptive patient, it is naturally a delicate task to seek to examine all the members of the family. Few physicians can afford to work in every instance for nothing and small minds may interpret the honest desire of a physician to do his duty as a scheme to make money. There is only one way of avoiding this suspicion; that is, for the physician to tell these families to have their regular family physician examine them, or if they have none, to call in some physician they may have consulted before, when in need of medical advice.

The physician treating a family where there is a consumptive should bear in mind the multiple sources of postnatal infection and insist upon the carrying out of the precautions to prevent them. He should see that an inherited predisposition in any one of the members is overcome by the proper care that should be bestowed upon them. If at all possible, predisposed children should be sent to open air schools; but they should never be sent to school before the age of eight.

The physician of such a family has a great

responsibility in regard to the lives of the children. When the time comes for them to choose a trade or profession, they should not follow occupations which are likely to increase their susceptibility to tuberculosis. They should be prevented from following the occupation of the father if the physician has cause to believe that the employment in which a consumptive parent had been engaged was in a measure responsible for the development of the disease. Thus, for example, the daughter of a consumptive seamstress should not also become a seamstress; the son of a consumptive tailor, hat maker, weaver, stonecutter, etc., should not follow the same confining or predisposing occupation.

Young men or women with hereditary predispositions to tuberculosis, should seek occupation which will assure a good deal of open air exercise, without, however, exposing them to great physical strain and unusually hard work.

When the physician lives in a community where compulsory or even only voluntary notification of tuberculous cases is required, it is his bounden duty to report each case. He will thus enable the health authorities to have correct statistics and also enable them to trace and remove, in many instances, underlying causes of the prevalence of tuberculosis in certain localities, districts,

or even houses. The health authorities of any city, even if the notification is compulsory, will not interfere with the physician's patients if the former assumes the responsibility that the necessary precautions to prevent tuberculous infection will be carried out.

The physician, besides being the medical adviser of the family, is also a citizen and may at times be called upon for medical advice by the municipality in which he lives. In his double capacity of physician and citizen he is particularly fitted to organize and help the popular crusade against tuberculosis. In communities where there are no anti-tuberculosis committees or associations, the progressive physician should see that they are started, maintained, and do the necessary work. He should be helpful to combat tuberculosis in his community in every way his time and means allow.

The physician treating tuberculous patients not only has a responsibility toward the community in which he lives, but also one toward the many communities located in regions reputed for certain climatic advantages. Should a physician send a patient in the curable stage of a tuberculous disease, who has little or no means, to a far away climate in the hope that in a few weeks he may find light employment, when this patient

is still in need of rest and care? To do this is an injustice to the community to which the patient is sent. Even a patient in the very early stages of the disease should not be sent to such a distant climatic resort, unless the physician is pretty certain that his patient will be able to work in a few weeks and to find work that will permit him to complete his cure. Not unless such a patient can with reasonable certainty be pronounced curable should he be sent away, and not without being provided with funds sufficient to last him at least a year.

If the patient is well to do and the physician knows that he will never become a burden to the community, it is his right and duty to send him to any climatic resort or institution where he thinks the patient will do well. Even in the advanced stages, if the patient has a desire for a change, the physician may yield to his wishes and allow him to go to a climate where he thinks he will feel more comfortable. The invalid should, of course, be accompanied by a trained nurse or attendant so that he will not be a source of danger to any one on the trip or in the place where he may become permanently located.

If a patient in the later, or even the earlier stages of the pulmonary tuberculosis is being treated in his own home and the physician finds

that a disinfection of the rooms in which the patient lives is desirable, he should not hesitate to inform the family and see that a thorough formaldehyde disinfection is made. The occasional disinfection of the personal effects of the patient is often advisable. In case of decease it is always best that everything the consumptive might have come in contact with—furniture, bedding, clothing, books, etc., should be thoroughly disinfected. In many communities such disinfection is now attended to by the board of health.

Where the aid of a health board can not be secured, the following directions will enable one to make a thorough disinfection by formaldehyde gas: 1. All cracks or openings in the plaster, in the floor, or about the doors or windows should be caulked tight with cotton or strips of cloth. 2. The linen, quilts, blankets, carpets, etc., should be stretched out on a line in order to expose as much surface as possible to the disinfectant. They should not be thrown into a heap. Books should be suspended by their covers, so that the pages will fall open and be freely exposed. 3. The walls and the floor of the room and the articles contained in it should be thoroughly sprayed with water. If masses of matter or sputum are dried on the floor, they should be

soaked with water and loosened. No vessel of water should, however, be allowed to remain in the room. 4. One hundred and fifty cubic centimeters (five ounces) of the commercial forty-per-cent solution of formalin for each one thousand cubic feet of space should be placed in the distilling apparatus and be distilled as rapidly as possible. The keyhole and spaces about the door should then be packed with cotton or cloth. 5. The room thus treated should remain closed at least ten hours. If there is much leakage of gas into the surrounding rooms, a second or third distillation of formalin should be made at intervals of two or three hours.

Whether the patient is treated at home for a little while or all the time, the supervision and guidance of the physician are essential. Whether the patient himself will be competent to carry out all the instructions given or whether it will be necessary for a member of the family, a friend, or a trained nurse to help the doctor, will depend upon the individual case. The extent of the disease, the character, the disposition, and the social environments of the patient will all have to be taken into consideration.

As has been said in the preface, this book is not intended to replace the physician, and the following instructions are only given to aid the physi-

cian in a general way and give him a foundation to which to add the more minute and individual advice each case may demand. Some of the necessary precautions indicated in this general advice have been already dwelt on in Chapter I. They are repeated here because of the conviction that when they are given by the physician of the family, their chances of being obeyed are materially increased.

GENERAL ADVICE TO THE CONSUMPTIVE PATIENT.

Be hopeful and cheerful, for your disease can be cured.

Avoid anxiety and worry as far as possible.

Do not talk to any one about your disease or symptoms except to your physician or nurse.

When indoors remain in the sunniest and best ventilated room. It is better to have no carpets or heavy hangings in the room; small rugs and washable curtains may be allowed. Cleaning should be done in such a way as not to raise any dust in the room.

Never sleep or stay in a hot room. Have your own sleeping room if possible, but always have your own bed, which should be freely aired during the daytime. In cold weather you may have a fire in the room, but keep the window wide enough open not to have the room warmer than 60° to 65° F.

Keep at least one window always open in your bedroom. Night air is as good and in cities even better than day air.

Have at least nine hours' sleep in the twenty-four and retire early. If you have to work during the week and feel as if you do not get a sufficient amount of rest, remain in bed all Sunday morning and get thoroughly rested.

If you are directed to sleep outdoors in a tent, on a veranda, on a porch, or in a window tent, begin gradually, and in cold weather be particular to dress warmly for the night and have plenty of bed covering. Your feet must be kept warm.

Remain in the sunshine as much as possible, except in very hot weather; but always protect your head. If there is no sheltered spot outdoors or on a veranda, the best place to take a sun-bath is in front of the open window. Extend yourself on a comfortable lounge with your head in the shade and the body bathed by the rays of the sun; remain there as long as you feel comfortable.

A feeling of discomfort, headache, or a rise of temperature are an indication that you have been exposed too much to the sun and that you must seek the advice of the physician before resuming the sun-baths.

Live as much as you can in the open air. Do not be afraid of cold weather; in snowy or rainy weather always wear rubber shoes and an outer garment which will keep you dry and warm. Remain indoors only on very windy and stormy days.

The rest cure in the open air on a reclining chair can and should be taken in all kinds of weather, providing you protect yourself against rain or too strong winds. Whether you are taking your rest cure outdoors during

the day, are sleeping outdoors, in a window-tent, or in a room with the windows wide open, if you suffer from the cold, it is time to return to the house or close part of the window. Protect yourself better the next time, for the air does not do you any good when you become chilled.

Dress yourself comfortably, but not so heavily as to hinder your movements. Discard chest-protectors, for they only tend to make you take colds more easily. Wear a suit of linen-mesh underwear; but do not change from wool to linen in cold weather unless you begin by wearing the linen-mesh next the skin and some warmer under-garment of cotton or wool over it. Keep your feet dry and warm, particularly when you are taking the rest cure in the open air in cold weather. Use a heated soapstone or hot water bag if necessary.

Take a bodily and mental rest on your comfortable reclining chair for about thirty minutes before and after the principal meals.

Do not take any kind of medicine (patent or other), peculiar food-substances, or exercises, except such as are prescribed by your physician.

Avoid all unnecessary exertions, mental or physical. Avoid exciting conversation. Never run nor lift heavy weights. Never take any exercises when you are tired, nor take them to the extent of getting tired. Avoid getting into perspiration.

When walking against the wind, riding in carriage or automobile, do not converse but keep your mouth closed and breathe through the nose only.

Take your walking exercises as you have been directed, and when feasible begin with walking slowly uphill; the return will then be easier.

Take your breathing exercises regularly as prescribed; always breathe through the nose.

Avoid strong draughts, dust, and dampness, and all places where the air is bad, such as theaters, concert halls, crowded meeting places, etc.

In cold weather bathe and dress in a warm room. If you sleep in a tent, have a fire made before rising; if on a veranda, have your bed rolled into a warm room or go there quickly, covering yourself with a coat or blanket. If you sleep in a window-tent, close the window and wait until the room is sufficiently warm before dressing. As a rule in winter do not leave the house until an hour after sunrise, because the air before that time is usually very much colder. By taking these precautions you will avoid being chilled.

Try to control your cough. You should train yourself to cough only when you have to expectorate.

All expectoration, discharges from the lungs and throat, contain germs. Some of these, especially when there is throat, bronchial, or lung trouble, are dangerous. Thus, it is best to be careful and gather all the expectoration, of whatever nature, and destroy it before harm can be done by it. To this end one should always expectorate in a proper receptacle and see to it that its contents are destroyed. Carelessness in this respect is sure to cause the spread of the disease to others. This

method of disposing of the sputum also protects the patient himself from taking the same germs into his system again, either by inhaling dust containing particles of the dried sputum or by infecting himself through sores. Be particularly careful when you have any wound or scratch on your hands, for if tuberculous matter comes in contact with an open wound local infection, or inoculation, may take place. It is not safe to use a handkerchief to spit into since in this way an infection of the nose is possible.

When at home always expectorate in a spittoon filled partially with water, or better, with water into which you have put one part of carbolic acid to twenty parts of water (five per cent solution). When you can not conveniently get at the stationary spittoon use a pocket spittoon. When away from home or if the use of such a pocket flask or spittoon is not practicable, use squares of muslin simulating handkerchiefs, or use Japanese handkerchiefs to expectorate into. Keep them in a leather pouch or in a pocket lined with impermeable material until you can burn them on your return home. Ladies should divide their handbags into two compartments to serve the same purpose. For people who live in flats where the cooking is done over gas, it may be difficult to find a place to burn the cheap handkerchiefs, rags, pasteboard pocket spittoons, or paper. While the thin paper might be thrown into the water-closet, this can not be done with rags or pasteboard. Individuals thus situated should use thin paper which they can throw into the water-closet, or a pocket flask of metal or

glass which should be emptied into the closet and cleaned with hot water. There are small and convenient ones to be had that can be hidden in the folds of a handkerchief when used.

All stationary spittoons should be covered, for flies and other insects may crawl over them, partake of the tuberculous matter and by depositing the latter on articles of food or elsewhere, become propagators of tuberculosis.

Whether sick or well never expectorate on the sidewalk but always in the gutter if there is no spittoon.

Never swallow your expectoration. Never use the same handkerchief to wipe your nose which you use to wipe your mouth after having expectorated. Always cover your mouth with a handkerchief or the hand while coughing or sneezing. Never kiss any one on the mouth nor allow it to be done to you.

Handle soiled personal and bed linen, especially handkerchiefs, as little as possible in the dry state. When soiled, place these articles in water until ready to be washed.

It is best not to wear any mustache or beard, but if worn they should be closely clipped.

Always wash your hands thoroughly before touching food.

Directions Concerning Food, Drink, Stimulants, etc.

Live on a mixed diet, that is to say, meat, fish, oysters, vegetables, especially spinach, lentils, cauliflower;

fresh and cooked fruit, particularly grapes; plenty of fresh milk, fresh eggs; all sorts of easily digested fats, especially butter. Thick, nourishing soups should be eaten with the principal meals. Raw, chopped or scraped beef is especially to be recommended. Whole-wheat bread being more nourishing than white bread, is to be preferred. Do not eat the inside of fresh bread; bread with a hard crust, toast and stale bread are more easily digested and more nourishing.

Eat slowly, chew your food well, take the milk in small swallows; take but little liquid during and shortly after meals. Keep your teeth in good condition; use toothpick and brush after each meal.

Never take any alcoholic beverages (wine, beer, or liquor) without special consent and the direction of your physician. Too much sweets (sugar, pies, pastry, etc.) should also be avoided, as well as all kinds of fried food.

Drink plenty of good, pure water between meal-times.

Do not use tobacco in any form; smoking cigarettes and inhaling the smoke is particularly injurious.

Directions Concerning Baths and the Use of Cold Water.

Take a short warm bath once a week, followed by a rapid sponging with cool water and a vigorous rubbing with a rough towel.

Wash your neck and chest every morning with cold water.

Take a cold douche every morning when so directed by your physician. If the reaction does not follow rapidly, seek his advice.

Special Advice to the Patient, Nurse, and the Family

Any intercurrent trouble, such as fever, indigestion, diarrhœa, constipation, increased cough, pain, reddish expectoration, or hemorrhage, should be at once reported to the physician. Do not, however, be alarmed if a hemorrhage occurs, as it is but one of the phases of the disease, and does not lessen the chances for recovery. Let the patient remain quiet on a reclining chair or on the bed and, until the arrival of the physician, place a cold compress or ice bag over the heart. In case of fever, particularly when it is as high as 100° or more, it is best for the patient to go to bed and await instructions from the physician.

A careful and obedient patient has all possible chances of getting well, while he who is careless and disobedient may forfeit all possibility of recovery.

To All Whom It May Concern

The careful, clean, and conscientious consumptive who is trained in the prevention of the disease, is not dangerous to those with whom he may live and work.

Signature of the Attending Physician.

The conscientious physician to whom the tuberculous patient comes for treatment, will not content himself with merely giving directions how to live

and what to eat, or prescribing medicine if such is needed. He will realize that he can not treat the patient successfully without having a knowledge of the latter's home environments. While the patient may be well enough to get about (ambulant) and to come regularly to the physician's office to report or be reëxamined, to see the patient occasionally in his home and talk with those with whom he is living, is an essential part of the judicious management of a tuberculous case.

The physician will not infrequently have to enter into the very soul life of the patient. To keep him hopeful and of good cheer he will often have to appeal for help to those living or associated with the patient. Worry and anxiety should as far as practicable be removed from the sick. A brooding mind is the worst thing for a consumptive, for he will not eat nor breathe as he should and his digestion will become more and more impaired. The more cheerful the physician is himself, the more hope and genuine sympathy he has as an equipment for his calling, the more certain will he be to benefit the tuberculous invalid.

CHAPTER IV

HOW THE SANATORIUM TREATMENT MAY BE ADAPTED TO AND IMITATED IN THE HOME OF THE CONSUMPTIVE

Many cases of tuberculosis, some among the well-to-do and some among the poor, will have to be treated at home; and when this is necessary we must seek to imitate in the home the methods in vogue in sanatoria where, so far, the best results have been obtained in the treatment of tuberculosis.

The first thing in all cases is to see that the patient is properly housed. Among the well-to-do and those having their own house, he should have two or three rooms on an upper floor at his disposal. In all cases where this is not feasible, select the best lighted and best ventilated room, preferably with southern exposure, for the patient to sleep in. It goes without question that even in the poorest family the patient should have his own bed, and if he is in the latter stage of the disease and obliged to spend day and night in bed, nothing will be so pleasant for him as to

have two beds at his disposal, one to rest in during the day and one to sleep in during the night. The furniture should be plain and simple, the chairs of wood, cane seated or leather covered. Plush furniture or any dust-catching material, heavy curtains, and fixed carpets should be avoided. Still, the room need not be made cheerless. A few small rugs, washable curtains, and some cheerful pictures to decorate the wall should be allowed.

As the most important curative agent in the modern treatment of tuberculosis we must first consider fresh, pure air. The home treatment can be made most successful when we imitate, as far as practicable, all the salient features of aërotherapy as practiced in the sanatorium treatment. In these institutions the patients live outdoors virtually twenty-four hours of the day.

Let us now see how we can imitate this aërotherapy of the sanatorium treatment in the home of the patient. In summer we have all the windows open and during the day we place our patient in the yard, on the veranda, or on the roof, whenever and wherever conditions permit us to have him take what is known as the rest-cure in the open air. Here he rests on a reclining chair which should have a proper knee bend and a comfortable back. If the patient can afford it,

we get him also a half-tent. (Fig. 15.) This half-tent is composed of a frame of steel tubing which can be folded together when not in use. Over this frame strong sail duck is stretched and secured by snap buttons on the inside, which protects the patient against wind and sun. To prevent the tent from being overturned by the wind, the frame has ground spikes holding it securely. The reclining chair is placed in this half-tent in such a manner that the floor bracing attached to the frame is held down by the chair, which adds to its security. A beach chair of wickerwork can also be made to do the service of the half-tent. After the seat has been removed, the inner walls of the wicker chair are lined with padding. A reclining chair is placed with its back in the interior, and the whole arranged so that the patient is protected from the wind and sun. Whenever the patient is on the chair he should be so com-

FIG. 15. Knopf's half-tent for the rest-cure in the open air. The detachable cover is made of sail canvas. When not in use the frame may be folded flat.

fortable as to allow complete muscular relaxation. Mind and body must be at rest. For poor patients the simple steamer chair and a few boards joined together to support the canvas will have to replace the more costly reclining chair and half-tent. A large and stout umbrella, such as is often used at seaside resorts, can be fastened to the back of the steamer chair and will make a good substitute when the tent can not be provided.

The poor patient in a city will probably be obliged to resort to the roof for his rest-cure, as the small yard of a tenement house, with many children playing in it, will scarcely be suitable. I do not favor the use of the fire escape for this purpose. A recent conflagration in the city of New York where lives were lost owing to the obstruction of the fire escape, showed the wrong of evading the law in this way. On the reclining chair in the open air the patient should remain during the day whenever he is not taking any exercise. In the modern American and also in some European sanatoria the majority of patients have their beds moved out on the veranda during the night, and there they sleep often in the coldest weather. That excellent results are obtained from sleeping outdoors in cold weather when everything is carefully arranged, is now a well-established fact.

When the patient has his own home and lives

FIG. 16. Sleeping Balcony Designed and Used by a Young Tuberculous Chemist of Boston.

in a village or small town, it is often very easy to arrange for sleeping on the veranda. Even a special porch for the exclusive use of the patient can often be built with relatively little expense. The accompanying picture (Fig. 16) shows such a porch which was devised by a young Massachusetts chemist, himself a sufferer. Realizing the value of fresh air treatment by day and by night, he had an outdoor bedroom constructed which was built in the south corner between the ell and the main portion of his house, covered at the top

and open on two sides. The dimensions of this little room were approximately 6 by 10 feet; it was firmly secured along two sides to the house, and supported at the outer corner by a stout timber from the ground. For the height of about 2½ feet from the floor there was a sheathed wall, the rest being open to the roof, which had a wide overhang to prevent as far as possible the dripping in of the rain. Curtains of canvas were provided, which pulled up from beneath, but which were used only in case of storm or wind. The window was cut down into a door to provide easy access from the house. This room was simply constructed, the outer wall being of pine sheathing. It had a tight double floor. The interior was a natural wood finish with no attempt to hide the rough beams, and the roof was covered with heavy roof paper known as rubberoid. The total expense for construction and painting was about $104. The location of the room was such that it was thoroughly protected from the north and west winds, and the situation of the house was quite favorable in that it was surrounded by open areas with numerous trees. A much simpler and less expensive construction is shown in Fig. 17, representing an original sleeping balcony in Hanover, Mass., used since June, 1898.

When the building of a special veranda or porch

FIG. 17. Original Sleeping Balcony in Hanover, Mass., Used Since June, 1898.

is not feasible and there is plenty of ground around the house, a so-called shack can be built and turned into most comfortable sleeping quarters for a patient. One of the latest and most practical shacks I have seen is the one designed by Dr. Millet of Brockton, Mass., to whom I am indebted for the illustration (Figs. 18 and 19) and description of this construction, so valuable in the treatment of the consumptive at home.

The following description will aid any one in a position to have such a shack to know how to build it. It should be remembered that the shack for tuberculous patients must have all the air and sun which can possibly be admitted to it, consistently with shelter from rain, snow, and

FIG. 18. Latest Model of Sleeping Shack Designed by Dr. Millet of Brockton, Mass.

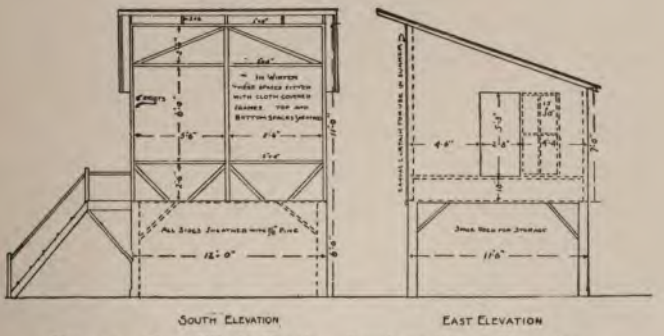

FIG. 19. Dr. Millet's Shack. South and East Elevations.

violent winds. For this purpose it should face the south; the front should be as open as possible, and should be much higher than the back, so that the sun's rays may reach all parts of the interior. There should be openings on all the other sides to give cross-currents of air, although all the openings, except those toward the south, should have provision for closing them in cold and stormy weather. Even the south openings should have screens of some sort for protection against southerly rains, but they will not often be brought into use. If the shack is near a dwelling house which the patient can reach easily, nothing more than a simple structure, 12 feet square, with three walls, a roof and floor, standing on posts, and costing about $100 complete, will be required; but for greater comfort, especially for patients unable to walk far, a dressing room may be added for about double the cost, such as is shown in the picture of Dr. Millet's shack. This building is 12 by 18 feet, supported on cedar posts, boarded and covered with shingles, with a shingled roof. It faces due south, and the roof rises toward the front at an angle with the horizon of 26½ degrees, known to builders as "quarter pitch." The interior is divided into a bedroom 12 by 12 feet, and a dressing room 6 by 12 feet. The front of the bedroom is entirely open. Sashes can be fitted

into the spaces between the posts if thought necessary, but experience shows that they are not required; light screens, covered with paraffined cloth, are found sufficient to exclude rain and snow. These screens are hinged to the top of the openings and are drawn up to the under side of the roof when not in use. The north wall of the bedroom is about 6½ feet high, and has three openings, closed in bad weather by hinged wooden shutters. Toward the west is the door from the outside and a window, and on the east is a sliding door leading into the dressing room which has a window opposite the door and also a south window. In the dressing room is a chimney and a stove, a set washbasin with running water, a water-closet, and a movable bureau, and a wardrobe. In pleasant weather the windows and door of the dressing room are kept open; in cold weather they are closed so that the water pipes may not freeze; but the bedroom openings are practically never closed. Except that of the chimney, the whole construction is of wood. There is no plastering, the partitions being of wood sheathing. The floor is double, the upper floor being of narrow rift North Carolina pine. The cost of this structure is $300, including the chimney, stove, and plumbing.

In places where the climate is relatively dry,

some sort of a tent may also serve the purpose of outdoor living. Figure 20 is an illustration of a suitable tent with a wooden floor.

With the devices just described, the open air cure can be carried out day and night in a small town or village, even in the homes of the relatively poor, with ease and little cost.

FIG. 20. The Tucker Tent for Outdoor Living.

What worried me for years was the fact that we could provide this open air treatment at night for such a relatively small number of patients in our large cities, when there are so many who need it particularly among the consumptive poor. I believe I have been fortunate enough to solve this problem in a measure by an unpretentious device which I call a "window-tent." After much experimenting, modelling, and remodelling to overcome the defects which I learned through my own experience and that of others in the use of the tent, I believe I am able to present to the profession and to the public a model as nearly complete and perfect as possible. Many of the unfortunate poor will, however, not even be able to pay the modest price at which

FIG. 21. Knopf's window-tent for the open air treatment of tuberculous patients. Tent in use with patient in bed looking through the celluloid window into the room, but breathing outdoor air only.

the window-tent is now put on the market, but with the illustrations before them they may have sufficient mechanical skill to imitate the device at very little cost.

As will be seen, this window-tent (Fig. 21) is an awning which, instead of being placed outside of the window, is attached to the inside of the room. It is so constructed that the air from the room can not enter or mix with the air in the tent. The

patient lying on the bed, which is placed parallel with the window, has his head and shoulders resting in the tent. By following the description closely, it will be seen (Fig. 22) that the ventilation is as nearly perfect as can be produced with so cheap a device. The tent is placed in the lower half of an American window, but it does not quite fill the lower half of the frame; a space of about three inches is left for the escape of the warm air in the room. By lowering the window, this space can be reduced to one inch or less, according to need. On extremely cold and windy nights there need not be left any open space at all above the tent frame. The patient's breath will rise to the top of the tent, the form of which aids in the ventilation. The tent is constructed of a series of four frames, made of Besse-

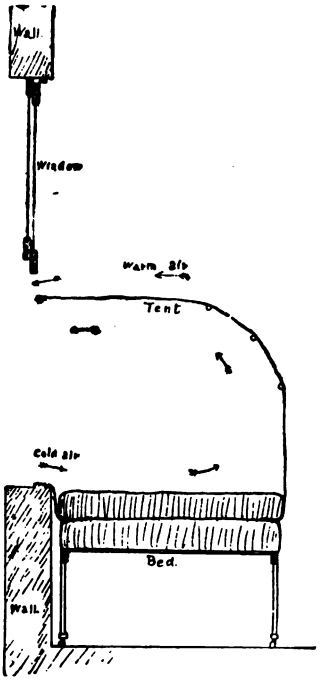

FIG. 22. Sectional View Showing the Ventilation of Knopf's Window-Tent.

mer rod suitably formed and furnished with hinged terminals, the hinges operating on a stout hinge pin at each end with suitable circular washers to insure independent and easy action in folding.

The frame is fitted with a cover of extra thick yacht sail twill having elongated ends, to admit of their being tucked in under and around the bedding to prevent the cold air from entering the room. The patient enters the bed and then the tent is lowered over him; or with the aid of a cord and a little pulley attached to the upper portion of the window, he can manipulate the lowering and raising of the tent himself. Shutters and Venetian blinds, whether they are attached on the inside or on the outside of the window, can be utilized in conjunction with the window-tent as a screen to intercept the gaze of the neighbors (Fig. 23), and in stormy weather as a protection. The bed can be placed by the window to suit the patient's preference for sleeping on his right or left side, so that he has the air most of the time in his face. The bed being placed alongside of the window will be convenient for a majority of the poor who have small rooms. If, however, the bed must be placed at a right angle to the window, this can be arranged as well. A piece of transparent celluloid is placed in the middle

portion of the tent to serve as an observation window for the nurse or members of the family to watch the patient if this is necessary. It also serves to make the patient feel less outdoors and more in contact with his family. He can, if he desires, see what is going on in the room. If the window-tent must be placed at a right angle to the window, the observation glass can be put in on the side. It is a general rule that patients should not smoke; when, in exceptional cases, this can be allowed, the danger of the celluloid window becoming ignited must be impressed upon them and the greatest caution urged. I prefer celluloid to glass because there is no danger of cuts or scratches with the possibility of tuberculous inoculation, as there would be if the glass should break.

FIG. 23. View of the Window-Tent and Patient Taken from the Outside.

If it is necessary to raise the bed to the height

FIG. 24. Knopf's Window-Tent Raised When Not in Use.

of the window-sill, this can be done with little expense. If the bed is of iron, a few additional inches of iron piping can be attached to the legs by any plumber or one handy with tools; raising a wooden bed can be accomplished with equal facility. If the window-tent is to serve the patient only during the night, it can be pulled up (Fig. 24) and the bed moved away from the window during the day, and the window closed. Or the tent can be taken from the hooks and put out of the way.

The window-tent will, of course, be of greatest service to the consumptive sufferer in winter. If he is feverish, or his stay in bed is advisable, he can spend his entire time in the window-tent. If

the people are poor and the room where the consumptive sufferer lies serves as living room for the rest of the family, the fact that the well members need not shiver and yet the patient can take his open air treatment, is of vital importance in many respects. While the room will not be quite as warm as if the window was entirely closed, it will be much warmer than if there was no tent in front of the open window. Leaving aside the economic advantages to a poor family when not obliged to heat more than one room, the patient feels that he does not deprive his loved ones of comfort and warmth, and that he is less a burden and hindrance to their happiness. The other members of the family, on the other hand, feel that they can give the patient all the air he needs and that he will not have to suffer for their comfort.

Besides the just mentioned advantages, there is another benefit derived from the use of the window-tent arrangement which will add to the patient's physical and mental comfort. His prolonged rest cure in bed will be more endurable when he is permitted to look out on the street and watch life there, than when obliged to gaze at the four walls of his room. An important advantage which the window-tent offers is the following: patients who can only be persuaded with

difficulty to sleep with the window wide open will not hesitate when they have this tent as an inducement. Draught, which the consumptive patient usually dreads, particularly in cold weather and when he perspires, need not be feared when sleeping in a window-tent. The construction is such that even should the shoulders be accidentally exposed, the three tent walls protect the patient from violent currents of air which may be produced by leaving opposite doors in the room open. In this respect the window-tent even has an advantage over sleeping on porches when they are not properly inclosed.

Lastly, an important point gained by the use of the window-tent for consumptives is in regard to the drop infection already explained in Chapter I. While, as a matter of course, the patient will have been taught always to hold his hand or handkerchief before his mouth when he coughs or sneezes, this is not always done and can not be done when coughing in sleep. To limit the possible infection to the interior of the window-tent is obviously a great advantage. First, the constant exposure to air and light of the bacilli which may have been expelled with the saliva and remain adherent to the canvas, will soon make them innoxious; secondly, the canvas of the tent is attached to the frame by simple bands, and

its removal from the frame for thorough cleansing, washing, or disinfection is thus made easy.

Another ingenious device, which can be applied very easily in a country town and in private houses, is Bull's aërarium. The fact that this device was not exactly suitable for consumptive dwellers in the tenement houses of a great city caused me to think out the window-tent just described. The aërarium of Dr. Bull is a double awning attached to the outside of the window with a special ventilating arrangement. (Fig. 25.) The head of a cot-bed is put through the window and thus the patient's head rests out of doors. (Fig. 25*a*.)

The veranda arrangement for the outdoor sleeping of the tuberculous patients was first suggested and carried out by Dr. C. S. Millet of Brockton, Mass., who showed that this could be done with benefit to the patient even in midwinter in the rigorous climate of Massachusetts.

In cold weather the patient's bed must be covered with a sufficient number of blankets to assure his absolute comfort and warmth throughout the night. Still, the covering should not be so heavy as to press down upon the body and make the patient feel uncomfortable or tire him. The tightly woven blanket is a better protection than the loosely woven one. The poor, whose

FIG. 25. Bull's Aërarium for the Open Air Treatment.

FIG. 25*a*. Sectional View of Bull's Aërarium.

supply of blankets is, alas, often very limited, may be advised to put several layers of newspapers between the coverings or sew a dozen layers of newspapers between two layers of dark colored cotton flannel. In extremely cold weather the patient, while sleeping in the window-tent or any other outdoor sleeping device, should wear a sweater and protect his head and ears with a woolen cap, shawl, or woolen helmet, such as is shown in the accompanying illustration. (Fig. 26.)

In order to insure absolute warmth for the patients sleeping on the veranda, in an open shack,

or in the window-tent, it may sometimes be necessary to resort to a special way of arranging the bed. There exist two methods of making a bed (which has been named the "Klondike Bed") suitable for outdoor sleeping. One method which originated at the Loomis Sanatorium is as follows:

FIG. 26. How to Dress for Outdoor Sleeping in Cold Weather.

Place two or three layers of heavy wrapping or building paper under the mattress. Several layers of newspapers would also answer the purpose. Place a heavy blanket, full length, across the bed with half of it extended over one side. Place another one likewise half extending over the other side of the bed. Now use a thin, washable double blanket lengthwise with closed end at foot. This one is to sleep between. Have end of the upper half of this blanket extend up to head of the bed and make an underfold of the corners of each side at the top. Place two or three heavy double blankets lengthwise of the bed, allowing sufficient on the top one to tuck in well at the foot. Now fold over the flaps of the

two blankets which were placed crosswise of the bed and tuck in at the sides.

In getting into the "Klondike" bed it is necessary to slide in at the top and if one lies on his side, the blanket which he is between (and which was placed up to the head of the bed with corners folded under) can be used to bring over the head and under the shoulders, tucking the opposite side under the chin so that the face only is exposed. This is considered to be one of the best features of this method of making the bed. The blanket is sufficient covering for the head, and for a quiet sleeper more comfortable than the knitted hood or cap. If one lies on his back a thin cap would be required to keep the ears warm, and the blanket can be tucked in around the neck. The bed made in this way can not easily get disarranged and requires to be made over entirely about twice a week.

Another way to make the "Klondike" bed is described in a circular on the Prevention of Tuberculosis issued by the Illinois State Board of Health. This method is as follows:

Make the bed in the usual way, allowing the coverings to fall loose on either side. Now gather up the coverings on one side and pass them beneath the blanket sheet to the center of the bed. Likewise do the same on the opposite side. Fold

in the clothing at the foot of the bed beneath the blanket sheet and the Klondike bag is ready to sleep in.

The usual manner of placing the pillows will be found unsuitable for cold winter nights, when the thermometer drops below zero, as it does sometimes in the Adirondacks. The cold wind is sure to blow down one's back. This may be overcome by arranging the pillows in the form of a V, with the apex at the head and the other ends reaching under the clothing.

Some patients complain that the bright light awakens them too early in the morning, and that they have difficulty in going to sleep again. In such instances they may place a piece of some light weight but dark colored material (such as a black lisle-thread hose) over the eyes. This usually suffices to obviate the inconvenience caused by the bright light.

The pulmonary invalid when in bed should be provided with a bell to communicate with his nurse, relatives, or friends who take care of him. He should, of course, have a small sputum cup or pocket flask handy to receive his expectoration. I prefer the flask for use in the window-tent, for it seems to me that any kind of cuspidor which had to stand on the window-sill would not be as safe, as there is always a danger of its falling.

A urinal should also be placed at the bedside, so that the patient will not have to leave the bed in the night and be uselessly chilled.

When arranging for the rest-cure in the reclining chair during the day, whether it is in the half tent, in the garden, on the veranda, in the sleeping shack, on the roof, or on a balcony, one should always bear in mind that it is much more agreeable and conducive to the well-being of the patient to have a pleasant view to look upon. In building sanatoria the greatest attention is paid to the proper selection of the place for the rest-cure gallery or veranda. The more pleasing and entertaining the outlook from these places, the more certain one is to keep the patients quiet and restful.

Where the choice of a place is limited, one will have to do the best he can. If there is no garden, veranda, porch, or flat roof that the patient may use, the window-tent can be put into service also for the rest-cure during the day. The bed is moved away and the reclining chair is put in its place. The latter can be raised to the necessary height by wooden blocks or a platform, and with the aid of blankets and comforters the air from the room can be excluded and the patient in front of the open window will breathe only outdoor air.

Sometimes the patient is so poor or so situated

that the purchase of an aërarium or window-tent is out of question. Or, again, a suitable outdoor or indoor arrangement for the fresh air cure can not be made at once. What, then, is the patient to do? He should move his bed as near as possible to the window and open the lower sash almost as wide as it will go, lowering the upper one a few inches from the top. If he finds that there is a draught, that the direct air in his face is too much, or if he does not wish to be seen by his neighbors, he can obviate all these difficulties by moving the bed about one or two feet from the window and placing a screen between the window and himself. To avoid draught he need not raise the window above the height of the screen. An even simpler device is a sheet tacked to the window-frame and drawn out over the bed to serve as an improvised-window tent.

When beginning the aërotherapy, or open air treatment, it is essential to do it gradually and according to the susceptibility of the patient to cold. The fact should be impressed upon him that night air is as pure as day air. If the treatment is started in midwinter, one should select the milder days for the beginning of outdoor sleeping or outdoor resting and start with a few hours at a time. A hot water-bag or hot soapstone for the feet, either in bed or in the chair,

may often be necessary in extremely cold weather. The patient's feet must be kept warm if he is to benefit from the open air treatment.

There is no reason why hydrotherapy, that is to say, the use of cold water as a curative agent, should not be employed in the home as well as in the sanatorium. It is a most valuable tonic and serves to prevent the patient from contracting colds, which are always apt to give him a set-back in the cure.

The physician will direct the hydrotherapy as well as the open air treatment. He will get his patient accustomed to the use of cold water by degrees. He will begin with a friction of the whole body with pure alcohol once or twice a day, for a number of days. This is followed by friction with half alcohol and half water, then for the same length of time with water alone; thus we come gradually to douches of cold water, which should be taken first with a temperature of 60° and gradually decreased to 40° F.

The physician will instruct his patient that a chilly sensation after the bath is a sign that he has not reacted well and that then the water must be more carefully tempered. Individualizing is most important in hydrotherapy for the tuberculous, and the use of cold douches or shower baths should not be resorted to without the special advice

of the physician. Children and the aged do not react as well as the adult or middle-aged, and in cold weather douches should never be given in cold rooms.

No elaborate hydrotherapeutic appliances are necessary in order to give a douche. In the families of the poor the luxury of the douche apparatus is unknown, and often they have not even a bath-room. In such instances I give the following advice: Procure a circular English bathtub, about three feet in diameter and ten inches high, and pour about five inches of cold or tepid water into it. The bather jumps into the water, keeping his feet in motion for a few seconds, then a second person pours quickly one or two pitcherfuls of water over each shoulder, thoroughly wetting the whole body. It is best to keep the head dry. The patient might be able to pour the water on himself, but the help of a second person will much facilitate the operation. If a hose can be attached to a near-by faucet, a douche, bath, or direct jet can be improvised. If the ambulant patient is obliged to attend to the douche himself, he should place a large empty washbowl or a small tub near the bed on the floor to stand in, and have a smaller washbowl filled with cold water placed at the height of the table with a good sized sponge. He may go to bed first and get thoroughly warm,

then rise, remove his night clothes and take his douche by standing in the larger bowl and squeezing out the sponge soaked in the cold water in the smaller basin once over his left shoulder, once over his right, once in front of the neck, and once over the back of the neck. Thus, the whole body will be douched. He should dry himself quickly, and if he feels chilly he can return to the warm bed. Unless the patient has been in the habit of using cold water and his reaction is perfect, that is to say, unless he experiences quickly a pleasant warm sensation after the application of cold water, the precaution just described of going first to bed to get warm and using warm water in the big tub to stand in, is to be strongly recommended.

CHAPTER V

HOW SANITATION AND PROPER HOUSING MAY HELP TOWARD THE PREVENTION OF TUBERCULOSIS

Hygiene and sanitation stand for the prevention of diseases, and in regard to tuberculosis it is our duty to trace the primary predisposing causes as well as the direct causes, and prevent them as far as lies in our power. One of the most important primary predisposing causes of tuberculosis is to be found in foul air due to unsanitary housing, overcrowding, and the narrow streets in cities which do not permit sufficient light and air to enter into the living apartments, shops, or factories situated on them.

It is doubtlessly in the polluted condition of the atmosphere that we must look for one of the causes of the great mortality from tuberculosis in large centers of population and in manufacturing districts. In our large cities, particularly in the lower strata of air where there is less diffusion of gases, complete change only takes place when it is sufficiently windy, and when the streets are wide enough and not lined by a row of

houses so high that there is almost no sunlight in them.

The diffusion of the gases of the air is, of course, still more limited in a closed room, and a change of air is impossible. The more individuals that occupy a limited inclosed space, the sooner will the air be unfit for human beings to breathe. At one time it was supposed that the diminution of oxygen and the increase of carbonic acid in an atmosphere vitiated by respiration were the chief causes of its noxious effect on the persons breathing it. The experiments of recent investigators, however, have thrown considerable doubt on that explanation.

The amount of carbonic acid ordinarily in the air, is from 3 to 4 parts in every 10,000, and the presence of this quantity will not be perceived by the normal human organism. Even as large a proportion as 1 per cent can be borne for some time without giving rise to disturbance; and air containing as much as 4 per cent has been breathed for ten minutes without harm (Huggard).

Carbonic acid owes its evil reputation chiefly, not to its own bad qualities, but to its bad company. Where the atmosphere of a room has been vitiated by respiration to such a degree that the amount of carbonic acid is 3 per 1,000, the air is distinctly unfit for breathing. The sub-

stances that cause the deterioration are unknown; but in such circumstances the carbonic acid serves as a measure of their amount. Air containing from 30 to 40 per cent of carbonic acid proves immediately fatal when a person enters it from the fresh air. The symptoms of poisoning from smaller quantities are generally paralysis and loss of consciousness. Carbonic acid gas exists in the blood chiefly in chemical combination with the salts of soda and with the hæmoglobin. The portion united with the hæmoglobin is displaced by oxygen at each inspiration.

Pure air strengthens and invigorates the body and increases the resisting power to disease; but it is most remarkable how the human system will, to a very large extent, become insensible to the fact that it is gradually being starved for want of a sufficient amount of pure air and thus poisoned by the various noxious by-products of respiration. Some one has described breathed air which is saturated with respiratory impurities as containing air sewage. As has been said, it does not seem to be so much the excess of carbonic acid as the additional by-products of expired air—vapors charged with toxic substances—which undermine the health. It would seem that when the human system reabsorbs the poisons exhaled from a pulmonary surface, by breathing

the air already breathed, a particularly suitable field of growth of the bacilli of tuberculosis is created.

In my labors among the poor of the tenement house districts in large cities I have often been amazed to see that people could live in an atmosphere which was so evidently vitiated and poisonous. The result of living under such conditions, be they produced in the home of the poor or the well-to-do, in factory or workshop, by ignorance or greed, is a diminished desire for deep, natural breathing; the respiratory centers become dulled by the excess of carbonic acid and the poisonous by-products of respiration in the atmosphere. The respiratory capacity of the lungs becomes more and more diminished and the individual receives only just enough oxygen to sustain life. A truly physiological hæmatosis, that is to say, a full physiological exchange of arterial (oxygenated) for venous blood in the lungs takes place but rarely. The thoracic or respiratory muscles in the chest, being little used, become atrophied (thinned and weakened), the individual assumes a stooping attitude and before he realizes it himself he has acquired the typical *habitus phthisicus*, that is to say, a narrow chest, stooping shoulders, and a pale and emaciated appearance. If such an individual should be exposed to the inhalation of the tubercle

bacilli in the form of tuberculous dust, should ingest tuberculous substance in the form of meat or milk from tuberculous cattle, should be accidentally inoculated with tuberculous matter through a scratch or wound, or be in close contact with a careless tuberculous patient, he is most liable to become infected.

The lower strata of the air in many city streets are very little stirred up by the winds passing over them, and this is all the more the case when the city is built in a valley.

In a country like the United States where the founding of new cities is nothing unusual, the builders of the future should bear in mind that a city situated on high ground with wide streets will be a healthy city and relatively free from tuberculosis. In existing cities the widening of streets and the lowering of too high buildings will help the freer circulation of air, and the admittance of sunlight will very materially improve the sanitary condition.

The city of Chicago is one of the healthiest cities in the United States, and while I gladly pay homage to the men at the head of its excellent sanitary supervision, there is no doubt in my mind that the wind to which the city is so much exposed is in no small degree responsible for its healthy condition.

Another important matter, which has a vital relation to tuberculosis and, in fact, to all diseases of the respiratory organs, should be taken into consideration by the builders of new cities. When it is possible, a city should be located near a wooded region, and the wanton destruction of the trees should never be allowed. Climate and atmosphere will always be more favorable, and diseases like tuberculosis, bronchitis, and pneumonia will be relatively rarer in wooded districts.

To give plenty of sunlight and air to the indoor workers of the city, houses should not be built higher than the width of the street. The greatest angle of direct light from the sky for the first floor should be 45°. The streets in all our cities should be laid out wide enough to permit the planting of trees on both sides, and the necessity for plenty of small parks and playgrounds should be borne in mind if the city is expected to have a low mortality from tuberculosis.

Of factory and workshop hygiene we will speak later on. Here we desire to show the importance of fresh and good air indoors because of its value as a preventive in tuberculosis.

All civilized men spend one-third of their lives indoors for sleep, and of all workers in the various fields of human activity by far the greater number have indoor occupations. According to the United

States census of 1900, there were 29,073,233 persons over ten years of age engaged in earning their livelihood in some one of 303 specified occupations, out of which only 46 could be strictly called outdoor occupations. The total number engaged in these latter were 12,058,671. The number engaged in the 257 indoor occupations would thus be 17,014,562. If we add to this the time all classes of people spend indoors for eating, for resting, for amusement, instruction or worship, well may we say that the greater part of the people of the United States virtually spend their lives indoors.

In order that the houses where people live should assure the individual the greatest possible amount of security against disease, particularly against tuberculosis, all human habitations, as far as practicable, should be built on good porous soil, preferably coarse sand or gravel; the next best is rock, and only third in order comes clay.

Private houses, whether occupied by one or two families, whether in the city or country, should be built so that there will be no dark rooms. All the living rooms should have southern exposure, even at the risk of having the kitchen and the rarely frequented parlor facing north.

In the absence of public playgrounds in large towns or cities, house-owners, either by single

endeavor or by combining with their immediate neighbors, might provide a private playground for the children. If this is not feasible, the roof of the house, with the aid of strong wire netting, should be transformed into a safe roof-garden and serve as a play place for the children. The accompanying picture (Fig. 27) shows how the roof of an ordinary city house can be made into an attractive playground for children.[1] In building individual private homes the sanitation often suffers from the desire for too many rooms; there must be a certain number, no matter how small, and usually they become badly lighted and ventilated on that account.

I consider our American windows, of which only one-half can be opened, inferior to the French casement windows which allow twice the amount of bad air to escape and good air to come in.

In the construction of even the better class hotels and apartment houses in which so many American families now make their homes, the same criticism of small rooms and the absence of a playground for children may be made. In building hotels and apartment houses, I consider it well-nigh criminal to raise them to such a height that the houses opposite or on the side are deprived

[1] There would be fewer children killed or injured by street vehicles if playgrounds were provided for them on the roofs.

FIG. 27. Children at Play on the Roof of a Private House in New York City.

of sunshine and light the greater part of the day. It would seem that a law limiting the height of buildings, particularly in the residential section of our American cities, is an urgent necessity.

The problem of housing our laboring population in large cities where, owing to lack of transit

facilities, the masses must remain near their places of work, has baffled the minds of our philanthropists, city authorities, and sanitarians. The congestion in some cities is something fearful to contemplate. This is particularly true of the city of New York, in some sections of which there are more people to the square mile than in either London, Paris, or Berlin. Our only salvation from this fearful situation, not only for New York but for many other American cities, lies on one hand in good and extensive rapid transit facilities, concomitant with the building of sanitary homes for the laboring masses where they can have comfort and home life at reasonable rentals; and on the other, in the building of model tenements in the cities.

There is a third way of solving this problem which is known as the Garden City movement. It originated in England, and has already found its imitators in the United States in what is known as the Garden Cities Association of America. Briefly stated, the aim of this splendid humanitarian movement is the founding and development in the country of industrial garden cities, in which, amid beautiful and healthful surroundings, factories, stores, or other forms of business may be established; and where the workers may have attractive, though inexpensive homes, well ventilated

and lighted, each with its own garden, and all to combine as many as possible of the attractions both of city and of country.

The Garden City Association of Great Britain is now building its first garden city at Letchworth, Hertfordshire, England.

It will be some time, however, before such movements can benefit the majority of workers, and we must consider the tenement houses as they will have to be erected in many cities. Ideal tenement houses were planned for the New York Tenement House Exhibition, and I give a reproduction of the one by Mr. R. Thomas Short, to which the prize was awarded in a competition of 175 architects. (Fig. 28.) I consider the model tenement house such an important feature in the prevention of tuberculosis that I feel it my duty to speak of this excellent plan somewhat in detail. It is designed for a tenement house on a lot 100 feet wide by 100 feet deep. A space 10 feet in width and 100 feet in length is left at the rear of the building for light and air, as required by the New York Building Laws. The main feature of the plan is the large street court, which in its narrowest part is 12 feet wide and one-half of which is 24 feet wide. This court is 60 feet in total depth, and provides an abundance of light and air for all the rooms. Being

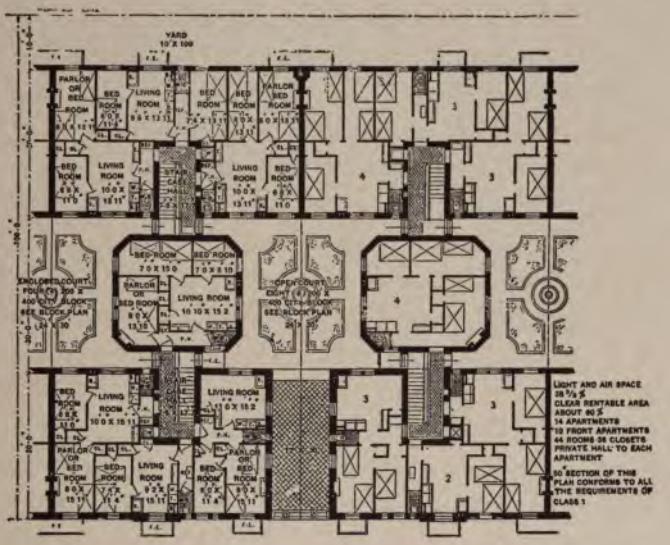

FIG. 28. R. Thomas Short's Prize Plan for a Model Tenement House.

open to the street, it permits free circulation of air at all times, and has the additional advantage of giving a number of rooms an outlook upon the street, thus creating a greater number of "front apartments," and materially increasing the rental values of the building. The plan provides accommodations for fourteen families on a floor, having a total of forty-four rooms, and an abundance of closets. The lack of closet space has been one of the serious inconveniences of tenement house life. Besides this, the plan possesses the

further advantage of having a private hall for every set of rooms, thus insuring privacy to the tenants. Every family has its own water-closet entirely within its control. There is no part of the building more than two rooms deep. This is the secret of the whole tenement-house problem, because it means that there are no dark interior rooms. Besides these many advantages, there are four light staircases and staircase halls provided for the tenants, thus securing greater safety in case of fire, and removing to a large extent much of the social friction that exists in the ordinary tenement house. A large open court also provides a natural playground for the children, and does away with the necessity of subjecting them to the influence of the street.

This plan is most excellent, but it does not quite realize my idea of what a model tenement house in our large cities should be, which is designed to help solve the tuberculosis problem. From what has been said in the preceding chapter, it must be clear to the reader that fresh air day and night is the best preventative and also one of the most important curative factors in tuberculosis. As we have seen, sleeping outdoors, weather permitting, is particularly useful in the treatment of tuberculosis, and it is of equal value in the prevention of the disease. I am sure that

FIG. 29. Elevation of Open Air Model Tenement House.

if the tenement house population of any large city would be convinced of this and, at the same time, facilities provided for them to sleep in the open air, tuberculosis would soon be eradicated among the masses.

A problem which I have longed to solve for years has been how to build tenement houses where, if all the inmates could not have balconies to sleep on, at least those might who would be greatly benefited thereby, whether because they were predisposed or actually tuberculous, or were convalescent from some other disease. On this subject I have consulted many times with my friend and fellow student, Professor John Van Pelt of the School of Architecture of Columbia University. It is thanks to his coöperation that I am able to present drawings and descriptions of such an open air tenement house in this little volume.

As the name indicates, this building (Fig. 29) is primarily designed to give plenty of light and air to each room and apartment, thereby assuring ventilation which can not be secured in the ordinary tenement. Furthermore, balconies are provided on which a number of the inmates may sleep in the open air.

The plan (Fig. 30) is so arranged that there will be large courts opening out upon the street insuring light at all hours of the day. These

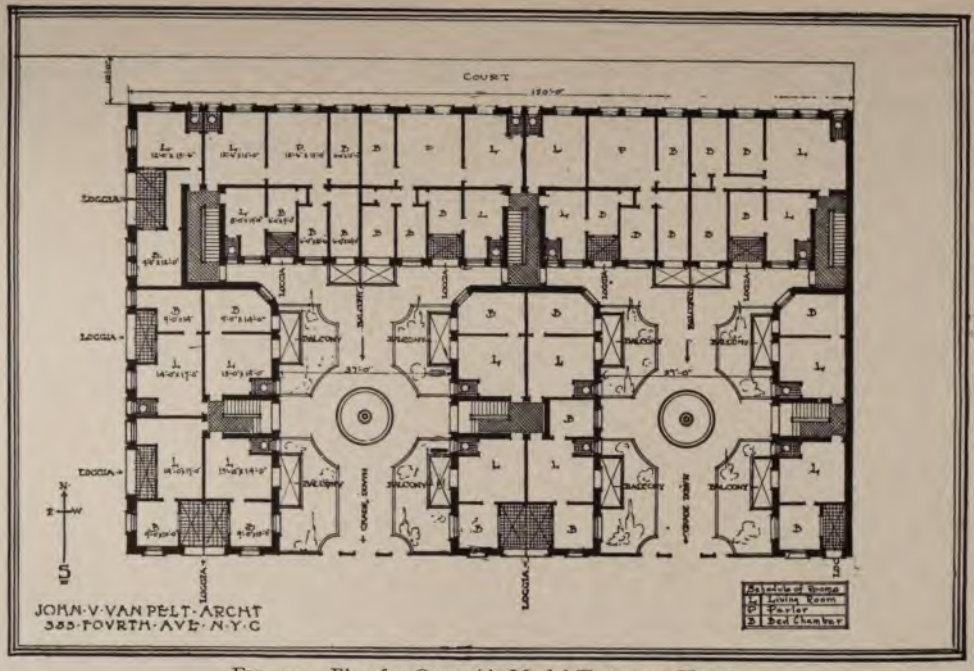

FIG. 30. Plan for Open Air Model Tenement House.

courts are 37′ wide and 60′ long. It is especially important that these courts open to the south, that the sun may penetrate to the rear of the court and dry both sides. It is also important that the interrelation between the height of the building, the depth of the court and its width be so proportioned that the lower floor and rear of the court shall receive several hours sunlight during the day.

In order to stimulate the movement of the air currents, it is important that the enclosure on the street side be as open and as low as possible. The present design shows a simple iron fence.

Moreover, the ground has been inclined up from the street so that moisture will tend to drain to the front of the court and not remain in a damp pocket at the back, and so that the colder, more impure, and heavier air of the court, tending to fall, will move toward the street and be replaced by fresher air coming from above. A grade of ½ inch to the foot or 5 per cent would not be too high for other practical purposes and would be useful from this point of view.

The building is divided into nineteen apartments on each floor. These apartments consist of two, three, four, and five rooms. The five-room apartments are the only ones that have a parlor. The others have living room and bedrooms.

All the apartments have some rooms on the sunny side. Each apartment has either a balcony or a recessed loggia; those upon the street being protected from view by an open-work screen with a space between the bottom of the screen and the floor, leaving the top open. This gives perfect circulation of air, yet would make them serviceable for sleeping.

The balconies are not run across the whole face of the wall so as not to cause any useless shade, and to allow as much light as possible to enter the windows of the rooms which are without balconies. The balconies are provided with open-work screens on either side, these being so installed that they can be folded back against the house like shutters during the daytime and in fine weather. When opened, they give privacy and some protection from severe winds. These screens might be advantageously fitted with louvres which could be closed.

French casement windows are used throughout the building, the whole window space opening to permit the maximum of fresh air and sunlight to enter.

The stairways and stairway hall are also very open. They are reached directly from the large courts and eliminate the dark, dreary stairways of the ordinary tenement.

Since an elevator would considerably increase the cost and maintenance of the building, a comfortable settee is installed at the end of each staircase to give the pulmonary invalid a chance to rest before mounting another flight.

Toilets are so placed that they will have ample ventilation and their quota of sunlight. They are kept free of the balconies.

It is probable that such a building would be of the semifireproof type. A fireproof construction is, however, far more advisable in that it affords less facility for the passage of vermin from one point to another. On account of the nature of the problem, it is evident that the expense in construction must be greater proportionately than that of the ordinary tenement, but such an increase can be kept within bounds and yet permit a high degree of efficiency in the sanitary conditions which will be afforded.

The courts, on account of their size and openness, afford space for the children to play in, keeping them off the street. Besides this, a roof garden is provided which can be made use of during the day and night. Separate water-closets for men and women are provided on the roof. The design shows plants which might be maintained in boxes on the roofs, the verdure serving to make the outlook more attractive.

It will probably be a long time before all the tenement houses in our large cities will have balconies for outdoor sleeping and such well ventilated bedrooms as to assure the greatest possible amount of pure air to those sleeping indoors; but can not something be done in the meantime to utilize the hundreds of acres of space represented by the flat roofs of a large city, such, for example, as New York? The hospitals in our large cities, whose ground space is necessarily limited, have already realized the inestimable value of the roofs for the open air cure of diseases of all kinds, not only tuberculosis. The accompanying picture (Fig. 31) shows a group of happy children, several of them operated on for surgical tuberculosis, on the roof of the New York Post-Graduate Medical School and Hospital. The Presbyterian Hospital treats its pneumonic children on the roof even in midwinter.

On page 92, Fig. 27, we showed a picture of the roof of a private house transformed into a playground. What a boon it would be to many a tenement dweller, and even to those dwelling in private homes and apartments, if during the sweltering heat of our summer nights comfortable sleeping quarters could be provided for them on the roofs! I am indebted to Mr. Frederick D. Greene for the accompanying inter-

FIG. 31. Group of Children, Operated on for Surgical Tuberculosis, at Play on the Roof of the N. Y. Post-Graduate Medical School.

FIG. 32. Roof Camping in Midsummer in New York.

esting picture illustrating what he calls "roof-camping" in New York City (Fig. 32); and what he says in his interesting article, "The Roofs of New York," which appeared in "Charities and the Commons," (now "The Survey") of August 15, 1908, may guide us in the better utilization of our housetops:

"The fact that New York roofs would not accommodate all who have been allowed by social negligence to herd under them to a degree that no intelligent breeder of hens or cattle would permit, is no reason why we should not at once turn to the roofs for the relief from night discomfort and congestion that they can afford to large numbers.

"Of course, there are difficulties to be surmounted under present conditions by those who would sleep on the roof. In many houses and even tenements the only access is up a ladder and through a scuttle two feet square. A parapet to prevent people from walking or rolling off is generally lacking. Points of attachment for supporting an awning or tent in case of rain are hard to find. The question of privacy and of safety from thieves must be considered. But all these difficulties can and must be overcome in order that this great boon—God's fresh air that blows over the city as well as over the country—may be enjoyed to the full.

"A readily accessible roof that can stand wear, and which is protected by a wall or iron fence, should be required by law as a *sine qua non* of every tenement and apartment house. This would put a safe, clean breathing spot within the reach of every mother, "little mother," and babe, without the crossing of a street.

"The roofs of the cities are undiscovered countries. In spite of incredulous smiles and friendly warnings the writer has been forming a delightful acquaintance with this country for some weeks."

Many of the roofs of the now existing tenement and apartment houses could be transformed, with relatively little expense, into secure playgrounds for children and decent and respectable sleeping accommodations for a goodly number, at least in the summer.

In cities and towns where land is relatively

cheap and many individuals own and build their own houses, the construction can easily be such that not only are there no dark and sunless bedrooms, but that any one of the members of a family can, if he wishes to accustom himself to it, enjoy the luxury of outdoor sleeping.

To plan for the construction of the open air private dwelling as well as for the open air tenement house already described, I consulted with Professor Van Pelt, who has devised a feasible way to construct such an ideal dwelling. The following is the plan and technical description of it which Mr. Van Pelt has been good enough to work out at my suggestion:

The residence shown in the accompanying picture and plans (Figs. 33, 34, 35) is designed so that it may have the best possible ventilation and sunlight in all its parts, to induce and realize, to the greatest extent, the out-of-door life.

The entrance vestibule, necessary for the middle of the winter, is so planned that it can be removed in summer, giving direct exit from the interior.

French windows are used wherever possible, permitting them to open to the full size of the window space.

Large fireplaces are introduced to give cheer and increase the ventilation.

This particular design shows the kitchen and

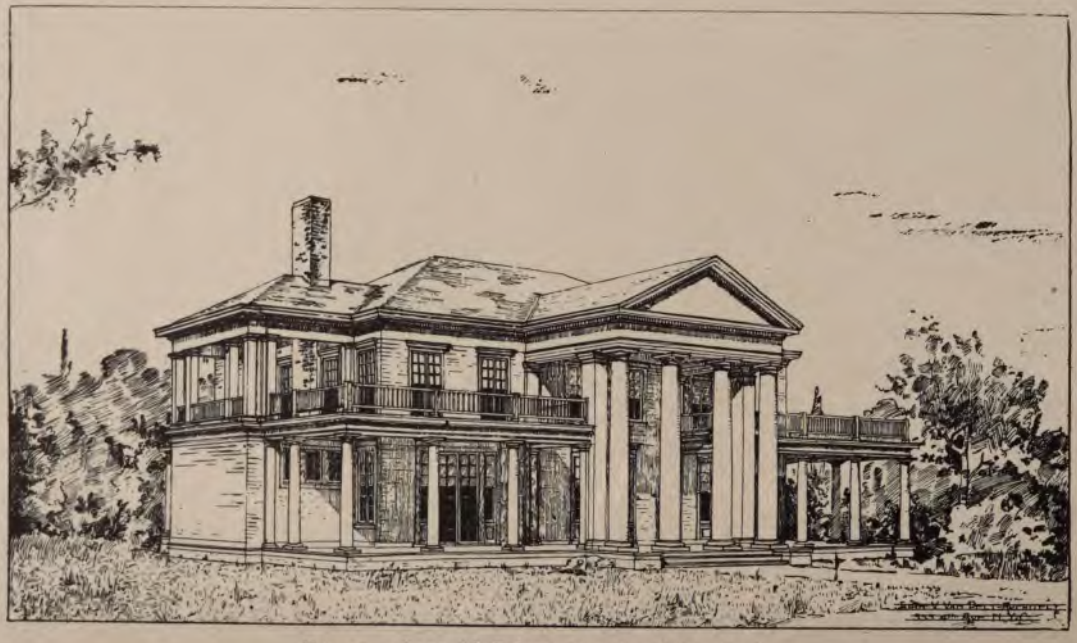

FIG. 33. Open Air Private Dwelling (Elevation).

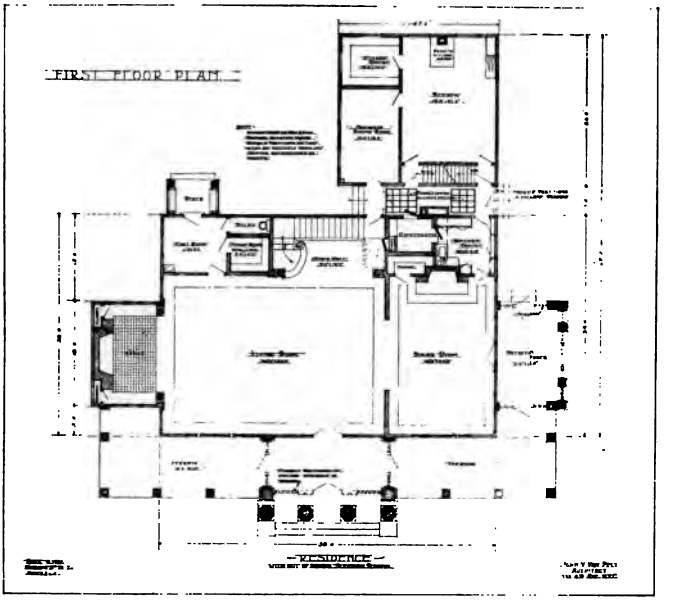

FIG. 34. First Floor Plan of Open Air Private Dwelling.

servants' wing entirely separated from the main portion of the house, which precludes the disagreeable permeation of the odors of cookery through the atmosphere of the main portion of the dwelling. The connecting porch between the kitchen and butler's pantry is roofed, and, in winter, this can be enclosed at either end so as to protect the servants; but the enclosures of this porch can be taken away when warm weather not only renders such protections unnecessary, but increases the invading quality of kitchen smells.

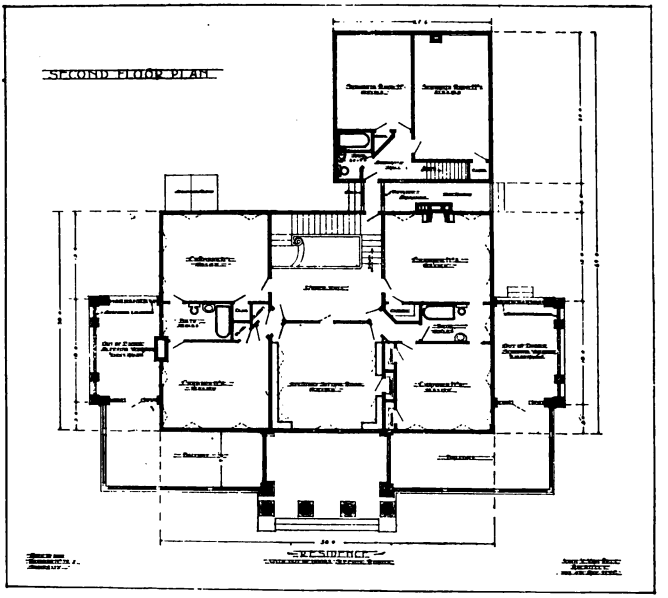

FIG. 35. Second Floor Plan of Open Air Private Dwelling.

The refrigerator is so planned that not only can ice be put into an upper compartment or tray from the outside, but a limited space can be opened up from the hall to keep a few bottles and cigars.

An open breakfast porch forms an extension to the dining room and is large enough to be used for other meals.

The especial feature of the house is the arrangement of the second floor, where the four bedrooms are situated in the four corners of the house, each one having windows on two sides to give cross-

ventilation, and each having an exposure which will permit sunlight to enter during a large portion of the day. Moreover, these bedrooms are connected either directly or through the bathroom, with out-of-door sleeping verandas, where the inmates may sleep winter and summer. Movable louvres and screens enclose these verandas so that they can be protected from mosquitoes, flies, and excess of light in the early morning, if that is desirable.

The second story sitting room would have louvres in the partition between it and the upper hall, so as to give cross-ventilation from one side of the house to the other. A passage from the main stairs to the servants' wing gives access for the maids.

The general material for the construction of this particular house is frame, and a Colonial style has been adopted; but the peculiar features of cross-ventilation, wide balconies, porches, and out-of-door sleeping verandas, can be accomplished in any style or building material.

The problem of providing cheap but good individual homes for our laboring classes where land is reasonable, but in a region easily accessible to their centers of work, is a very important matter. To see how reasonably such a home could be built, I consulted again with Mr. John Van

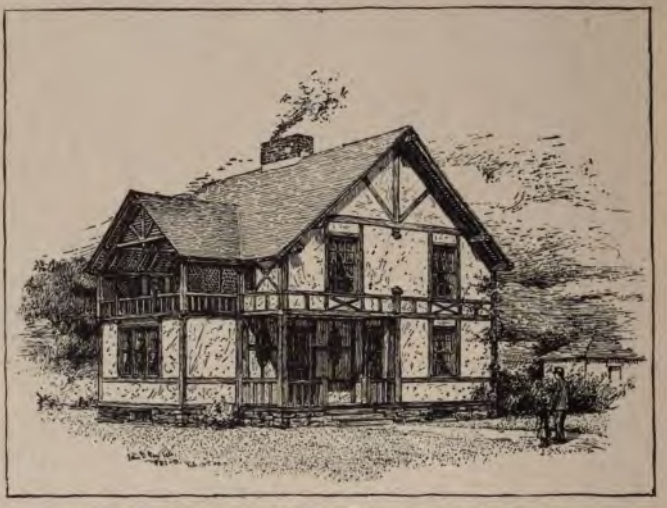

FIG. 36. Economical Sanitary House for One Family.

Pelt. I give the following illustrations, description, and plans (Figs. 36, 37, 38) which he worked out for this purpose:

The building has been planned in the most economical manner possible. A single chimney placed in the middle of the house affords a fireplace and contains flues from the heater and kitchen range.

All rooms, except the smallest bedroom, have two windows in different walls, insuring cross ventilation and at least one sunny exposure. The fireplace in the living room acts as an aspirator for foul air and has a 12″ by 12″ flue.

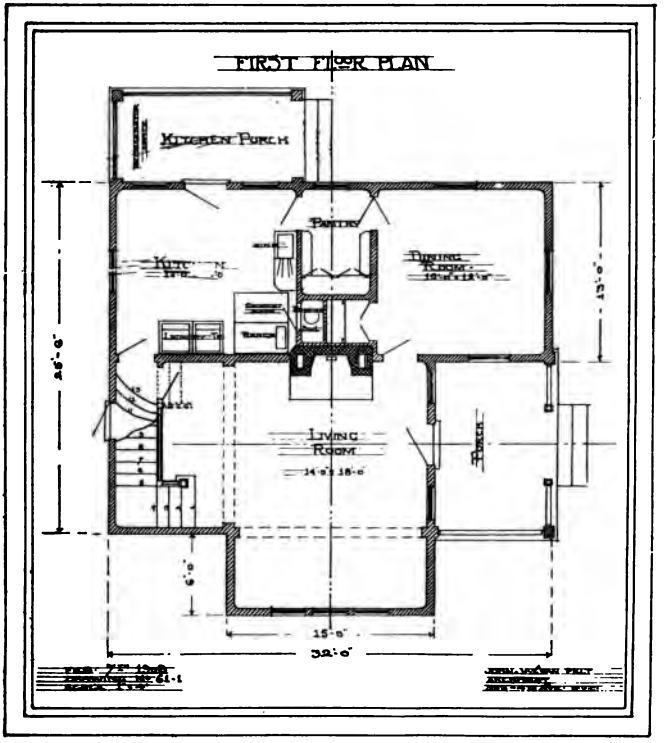

FIG. 37. First Floor Plan of Economical Sanitary House for One Family.

Hot air heating is adopted with the cold air intake, bringing air directly from the exterior, each room being provided with a riser, conducting this warmed air to the different parts of the house. The cellar stairs go down under the main stairs, and a door leading from these stairs to the ex-

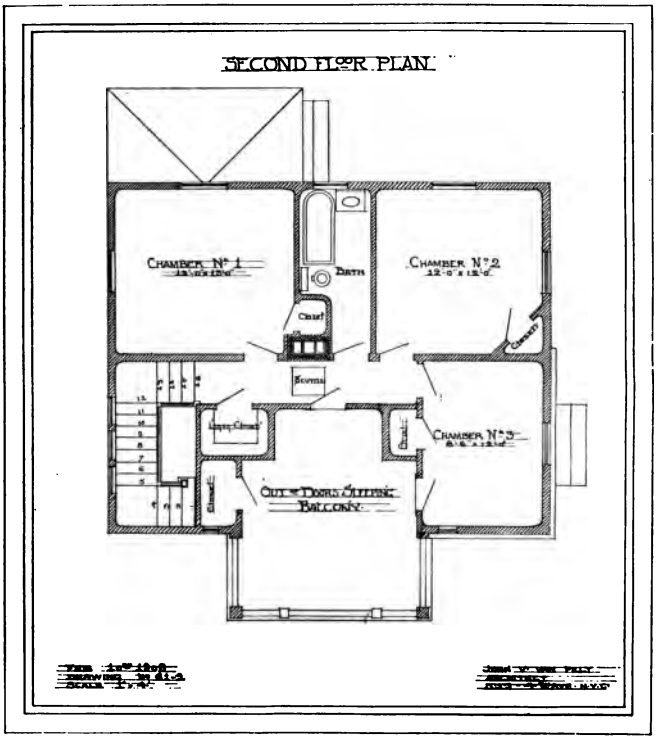

FIG. 38. Second Floor Plan of Economical Sanitary House for One Family.

terior makes it possible to carry the ashes, which descend to the ash pit in the cellar through a dust chute from the fireplace and those which also accumulate from the hot air furnace, directly out of doors without spreading dust through the house.

The plumbing is centralized, a single soil pipe

being sufficient, and the hot water boiler is placed in a compartment behind the chimney so as to alleviate the conditions that lead to an overheated kitchen. The laundry tubs have been placed in the kitchen, as the wives of workmen must do all their work and should be as near their family as possible. Space has been provided on the back porch for the refrigerator, a lattice surrounding the same to give shade.

All of the bedrooms have closets, and a broom and linen closet is also provided on the upper floor.

In the interior treatment of the house, dust-gathering projections are avoided as much as possible. Reëntrant corners are rounded, and a cove and sanitary base are used. The framework is stud partition with rubble or cement block foundation wall, according to locality. A half-timber effect is obtained with stucco in between, the house being sheathed and covered with building paper before the latter is put on. The roof is shingled. The floor and wainscot of the large sleeping balcony of the second story are made of one of the magnesite compositions which have lately been used most economically and successfully in similar cases.

The house is piped with gas, but not wired for electricity on account of the expense. If the

cost permits, such houses should be painted on the interior, the last coat being laid on flat; but if this is impossible, water color can be substituted.

Under favorable circumstances, such a house should be built for $2,800. In smaller proportions it can be built for $1,650. What is most valuable and interesting in this individual workingman's house, which can be constructed at so low a figure, is that there is enough veranda space for the majority of the members of a family to sleep outdoors if they desire to do so. As in the open air tenement house, the balconies are provided with openwork screens on either side, these being so installed that they can be folded back during the daytime and in fine weather. They also serve to give privacy and protection from severe winds.

The next subject which we have to consider is the problem of lodging houses. Those who have ever visited a cheap private lodging house will understand why I favor municipal lodging houses, which are of necessity under better control. My visits to lodging houses in the various parts of the country have shown me that, owing to the large number of individuals who usually occupy these hostelries, the ventilation is always insufficient, particularly at night. If there is any class of

buildings where our American windows should be replaced by the French type, it is in our private and public lodging houses.

There is so much tuberculosis to be found in lodging houses that the transmission of the disease from the consumptive lodger to the healthy inmate is altogether too frequent. In view of the fact that droplet infection is possible at a shorter distance than three feet, I consider any lodging house law not quite up to date which does not require a passageway of at least three feet between the beds, and that the beds should be so arranged that the air can circulate freely under each of them. At least 500 cubic feet of air should be provided for each bed and lodger, and no more beds should be permitted than those provided in this way, unless unusually free and adequate means of ventilation exist and are approved of by the local Board of Health.

The internal arrangements and sanitation of our homes has as much to do with tuberculosis as the choosing of sites for future cities and the erection of buildings, and some of the defects referred to in the preceding paragraph on lodging houses are also found in many homes of rich and poor alike, and even in fashionable hotels.

We select for our bedrooms, as a rule, not the best but the worst lighted rooms. The majority

of our city apartment and tenement houses are built in such a manner that only the two end rooms of the flat receive direct air and light. Thousands and thousands of persons in our large cities are thus compelled to spend their nights in rooms where sunlight has never entered. The strange custom of reserving the very best room, that is to say the room which might be the best lighted and best ventilated, to receive an occasional guest is not confined to country folks and poor city apartment or tenement dwellers. I have seen this done by well-to-do people who could have done better and should have known better. I recall one instance from my own practice where two anæmic children of six and eight years of age were forced to sleep in a dark bedroom and play in the dark dining room or ill ventilated kitchen, while the large front room, the so-called parlor, with two large windows where the sun would stream in a good part of the day if admitted, was locked all the time except on Sundays when visitors were expected. The little ones were not allowed to go in there for fear that they might do harm to the good furniture. It was with the greatest of difficulty that these otherwise good parents were persuaded to transform the large parlor into a bedroom and playroom for the children.

The reader will recall, from what has been said before, that the blood is one of our most powerful defenses against the invasion of bacilli. In the anæmic person the blood is so impoverished that the corpuscles would no longer have the power to annihilate the germs of tuberculosis if they should happen to enter the system.

Some people are not only afraid of sunlight and fresh air during the day, but they are particularly afraid of night air. The fear of night air, this nightmare of our ancestors, has not a little to do with the development and propagation of indoor diseases, and particularly tuberculosis. In this respect the heads of institutions where there are dormitories for the inmates are often the greatest violators of this first principle of hygiene. To have two or three and sometimes four children sleep in one bed, whether in a private home or an institution, should be considered absolutely unhygienic. People should learn that it is the best economy in the end to use the best lighted and best ventilated rooms for bedrooms and sitting rooms, and whenever it is possible there should be a single bed for each member of the family.

That the method of heating also has a great deal to do with diseases, particularly those of the respiratory organs, is well known. From what I have learned by personal experience and from

conversations with persons who are authorities on the subject, it would seem that the best method of heating buildings in general is one that brings warm fresh air into the rooms. The objection to a furnace is that it overheats a small quantity of air which it forces into the rooms after it may have been burned. A better system, therefore, is one of direct heating, whereby a large quantity of moderately warmed air is brought into the room say over steam, or better yet, hot water coils. A hot air furnace installation is the cheapest, and is therefore the best that can be used for the poor. Ordinarily, the poor heat with stoves which combine the objectionable features of systems that heat the air contained in the rooms without changing it, with the objections to systems that burn the air; moreover, presenting great danger of allowing gas to escape. Especially is carbon monoxide given off through the pores of the iron when these stoves become red-hot. The usual systems adopted in homes on account of the balancing between expense, convenience, and hygienic reasons are steam heat, or better but more expensive, hot water, with radiators placed directly in the rooms. There are so many cracks in the ordinary house that considerable ventilation is assured. Moreover, most houses have fireplaces which promote some ventilation even if there is no fire burning.

Many of our American houses, however, are too tightly built, are kept at too high temperature and the air is not changed often enough. Besides all this, the air we breathe in many of our overheated houses is altogether too dry to be sanitary. Experience has proven that we can be perfectly comfortable in a temperature of 65° F. and even a little lower, provided that the relative percentage of moisture is 60. If this moisture falls to 30 or 20 per cent, then the dry throat, dry nose, and dry skin are in evidence. The explanation is simple. The dry air absorbs the moisture from the body and causes discomfort. The drying of mucous membranes in this way lays them open to the invasion of the organisms causing colds, grippe, pneumonia, and tuberculosis. Thus, the excessively dry atmosphere of many city and country homes in winter often gives rise to nasal catarrh, a condition which everybody, but especially those suffering from pulmonary diseases or prone to them, should be anxious to avoid.

Besides keeping the water pan in the furnace constantly filled, there should be in the sitting room and sleeping rooms some evaporating arrangement, such as the one known as a humidifier. (Fig. 39.) More simple evaporating devices, however, such as a vessel filled with water and a cloth suspended above it touching the water so as to

FIG. 39. Barnes' Humidifier.

produce capillary attraction, will render the atmosphere sufficiently moist. To determine the proper humidity, the direct reading hair hygrometer (Fig. 40) answers all practical purposes.

After vitiated air, dust is the next most important as a predisposing factor to tuberculosis. Even the so-called sterile dust of the mineral or vegetable kind, if constantly inhaled, will irritate and inflame the respiratory tract and leave the mucous membrane in a condition for the ready invasion of any of the pathogenic microörganisms. It must be remembered that even in the normal individual we not infrequently find the pneumonia producing pneumococcus and the Klebs-Leffler bacillus which is the specific organism of diphtheria. The individual a little below par in general health or who

has his upper respiratory tract irritated by the constant inhalation of dust, may thus fall a prey to the microörganisms of pneumonia or diphtheria of which he was the host, or to the bacillus of tuberculosis or of grippe from external sources.

FIG. 40. Direct Reading Hair-hygrometer to Determine Humidity in Rooms.

The dust problem is so great and so important that we should give it our special attention. The amount of dust that originates in our houses from wear and tear, etc., should be minimized by having as few carpets and hangings as may be, and by sweeping and cleaning in the proper way. The following rules for sweeping and dusting compiled by Professor T. Mitchell Prudden, a member of our New York Tuberculosis Committee, deserve the widest distribution:

When you sweep a room raise as little dust as possible, because this dust when breathed irritates the nose and throat, and may set up catarrh. Some of the dust breathed in dusty air reaches the lungs, making parts of them black and hard and useless.

If the dust in the air you breathe contains germs of consumption (tubercle bacilli) which have come from

consumptives spitting on the floors, you run the risk of getting consumption yourself. If consumptives use proper spit-cups and are careful in coughing or sneezing to hold the hand or handkerchief over the nose and mouth so as not to scatter spittle about in the air, the risk of getting the disease by living in the same room is mostly removed.

To prevent making a great dust in sweeping, use moist sawdust on bare floors. When the room is carpeted, moisten a newspaper and tear it into small scraps and scatter these over the carpet when you begin sweeping. As you sweep, brush the papers along with the broom and they will catch most of the dust and hold it fast, just as the sawdust does on the bare floors. Do not have either the paper or the sawdust dripping wet, only moist.

There is also an amount of dust, sometimes dangerous, that is carried in on our shoes and clothing, especially on the ladies' long skirts. It is to be hoped that the requirements of health will so dictate to fashion that trains will never be seen on our streets. In the opposite event I am willing to be put down as one who favors the enactment and enforcement of a law prohibiting the trailing of skirts in public highways.

When, on account of the presence of a tuberculous invalid or susceptible children in the home, one wishes to be particularly careful to exclude

street dirt, one may have in front of the door leading to his apartment an apparatus composed of two blocks over which is stretched a slightly moistened canvas. After a thorough cleaning on the mat or scraper outside, one passes his soles over this moistened canvas for a final cleaning. An ordinary doormat may serve to dry the moist soles. When, out of consideration for the consumptive member of the family, we wish to diminish the dust which is brought in on our outside garments, we should make it a practice to keep overcoats or dusters in a wardrobe near the door and brush them as well as all other garments in the open air. It is astonishing how much less dirt is carried into the rooms if these two simple means are conscientiously employed.

Against the dust which blows into the rooms from building material, we are powerless. Perhaps if Edison's plan of using reinforced concrete for the complete construction of houses comes into general use, we shall have less dust to cope with. This material would seem to be well adapted for homes for the masses, as houses such as the one of which the great inventor recently showed me the plan, can well be constructed for about $1,000. The moulds are set up in place and the whole house is made in one piece.

CHAPTER VI

THE DUTIES OF MODERN MUNICIPAL HEALTH AUTHORITIES

One of the many causes of impurity of the atmosphere in cities is the imperfect combustion of fuel. How to do away with the smoke nuisance is an exceedingly difficult problem. In many cities the use of soft coal cannot be forbidden by law because hard coal is not available, or available only at a very high price. It has been demonstrated that with care the skilled stoker can diminish the amount of smoke produced even by the lowest grade of coal. It would thus seem that in cities and towns where hard coal can not be universally used on account of its price, the municipality should offer gratuitious instruction in the proper methods of burning soft coal to all those handling furnaces. Where this is done, city ordinances should be enacted and enforced with a view to minimizing the smoke nuisance.

The futility of merely placing an ordinance on the law books of a city has been demonstrated by the fact that Pittsburg, Cleveland, Cincinnati,

and Chicago have not been able to make the slightest headway against the tremendous production of smoke. It is only now that Chicago is beginning to gain any ground, and this is due to the fact that Mr. Bird, the smoke inspector, has adopted entirely new tactics. In the first place, Mayor Busse has spent his whole life in the coal business and knows more or less about smoke prevention. He appointed Mr. Bird, who is a practical man, and then arranged to give him an advisory board of three expert engineers. Among them is Mr. Bement who designed the plant for the Commonwealth Edison Company. Shortly after taking office, Mr. Bird announced that he did not propose at once to fine the owner of a building the chimney of which was smoking. He said that he would go into the fire room of the offending building and would study conditions. He and his advisory board would then map out a plan for the prevention of smoke, taking into consideration the grade of coal habitually burned. He would submit this plan free of cost to the owner of the building and would give a reasonable length of time for the compliance of the owner with these requirements of the city department. If, at the expiration of this reasonable time, the chimney was still smoking and no progress had been made toward the installation of a new sys-

tem which would avoid smoke, the law would be invoked and the maximum penalty would be imposed. I am indebted for this information to "A Practical Campaign for Smoke Prevention," by George H. Cushing, which appeared in the "American Review of Reviews," July, 1908.

From a very interesting report on smoke in relation to health, by Prof. A. Jacobi of New York, the Nestor of American physicians, who has taken a lifelong interest in the combat against tuberculosis, we learn that the latter disease and also bronchitis and pneumonia have decreased since 1895 in London, Liverpool, and Manchester; that is to say, since the time an active anti-smoke crusade was started in those cities. One of the most important features of this crusade is a law limiting the time when black smoke may be expelled. Thus, in London and Manchester no factory chimney may expel black smoke for more than a minute every hour. In Professor Harvey Littlejohn's report on causes and prevention of smoke from manufacturing chimneys (city of Sheffield, 1897) are enumerated twenty-two cities which enforce a duration of not more than from one to fifteen minutes in which black smoke may be expelled each hour.

The official work of the health boards has been aided by a number of coal smoke abatement

societies in London and elsewhere, which employ their own watchers and inspectors alongside those employed by the government. It will not be very long before manufacturers and engineers will cease to object to the compulsory avoidance of smoke on account of the acknowledged economic advantage due to a saving of coal.

That coal will be replaced by gas, which burns without smoke, appears more probable from year to year. Even in America where we are somewhat slow in adopting sanitary measures, we have begun to replace coal by gas for domestic purposes. A cheap gas may be, and has been manufactured in South Staffordshire and in London, which, while not fit for illumination, is perfectly so for developing smokeless heat.

In a presidential address before a conference on smoke abatement, in 1906, Sir Oliver Lodge admonished his audience directly not to permit the combustion of coal in cities, but to insist on the regular preparation of cheap gas instead. I am afraid in America we have been too slow even to utilize natural gas as we should have done.

There is no doubt but with a combined effort of municipalities, individual owners of factories and workshops, and the educated and willing citizens, much can be done to minimize the danger arising from the incomplete combustion of coal and

from the inhalation of organic and inorganic dust.

The smoke nuisance in a large city can be considerably decreased by insisting that all incoming and outgoing trains, from a certain necessary distance beyond the city limits, must be drawn by electric engines or by what is called the fireless locomotive. This locomotive, of which the motive power is a steam tank filled at a power station, is suited for use on railways where the question of fire protection is almost a first consideration, as, for example, where there are powder plants or cotton mills, or on wharves, and other places where the presence of an ordinary type of locomotive, or even electric power would be unsafe.

Some day our federal government will have to step in and help the municipal and state governments to solve this great problem. Our bureaus of forestry, geology, and commerce will have to institute research work in order to minimize the smoke nuisance, not only on account of the sanitary conditions but for purely economic reasons. Millions and millions of dollars go to waste by inefficient combustion. It is the duty of the government to see that the fuel resources of the country, upon which the future prosperity of the nation depends, are utilized to their highest efficiency.

Besides the smoke, a modern city government also should strive to do away with the presence of noxious gases and needless dust. In manufacturing centers special ordinances may be necessary to prevent the escape of poisonous gases into the air, but in every city we have to cope with the dust.

Streets should be sprinkled regularly in dry and warm weather, and while flushing them with a moderate force of water is excellent, too great a force wears pot holes in the asphalt paving, thus doing more harm than good. A sprinkling cart or a hose of small caliber should be used.

If the street car companies could be induced to coöperate with the city by sprinkling their tracks, much comfort would surely be assured to their patrons, and some of the dangers from dust removed. Any one who has noticed the cloud of dust that follows a swiftly moving car or the amount that is carried in by the back draught when the weather permits having the rear doors open, would appreciate the abatement of this unhygienic and unpleasant condition.

As stated before, the inhalation of a great deal of dust has a tendency to irritate the mucous membrane of the respiratory tract, thus making it more vulnerable to germs and particularly to those of tuberculosis.

FIG. 41. Knopf's elevated self-cleaning street and garden spittoon.

FIG. 42. Knopf-Thiebert self-flushing elevated cuspidor with cover for railway stations, etc.

The cleaning of streets should be done, as far as possible, during the night and the collecting of ashes, garbage, etc., at least in the hours of the forenoon when the traffic is at its minimum. Collecting ashes should be done in such a manner that on windy days it has no chance to be blown about during the process of being dumped into the collecting wagons.

Public buildings which are much frequented should be swept with moist sawdust once or twice

a day according to the need. While the tuberculous sputum which has mingled with the dust in the street may be considered less harmful because it has been exposed to light and air, indiscriminate expectoration within buildings, halls, street cars, etc., is absolutely dangerous; and the enactment and enforcement of anti-spitting ordinances is of vital moment, and is one of the most important duties of a municipality. To forbid expectorating in such and such a place will not, however, be alone sufficient; it is also essential to provide well-kept cuspidors in public places. The ideal cuspidor for the purpose is, of course, the self-flushing one with cover, having a supply and waste pipe. (Figs. 41, 42.)

Every progressive municipality must be awake to the fact that to prevent tuberculosis, to have the consumptive poor and those of moderate means cared for at the right time, at the right place, and by the right men, means the sanitary and moral improvement of the town or city, and actual financial gain in the end.

Having been associated for many years with the Health Department of the City of New York, which, through its efficient work under the leadership of Dr. Hermann M. Biggs, has accomplished so much in the prevention of tuberculosis; and having convinced myself of the excellent results and

collaborated in the work, I am in a position to speak somewhat in detail of what the municipal health authorities of the City of New York have been and are doing, which will serve as an illustration of what can and should be done.

First of all, the New York Health Department keeps up a constant educational campaign. For this purpose it issues a circular which I reproduce here with some slight modifications and additions.

Consumption Is a Preventable and Curable Disease.

INFORMATION FOR CONSUMPTIVES AND THOSE LIVING WITH THEM.

CONSUMPTION, ALSO CALLED PULMONARY TUBERCULOSIS, IS CHIEFLY CAUSED BY THE FILTHY HABIT OF SPITTING.

Consumption is a disease of the lungs, which is taken from others and is not simply caused by colds, although a cold may make it easier to take the disease. It is caused by very minute germs, which usually enter the body with the air breathed. The matter which consumptives cough or spit up contains these germs in great numbers—frequently millions are discharged in a single day. This matter, spit upon the floor, wall or elsewhere, dries and is apt to become powdered and float in the air as dust. Thus dust contains the germs,

and thus they enter the body with the air breathed. Thus dust is especially likely to be dangerous within doors. The breath of the consumptive does not contain the germs, and will not produce the disease. A well person catches the disease from a consumptive only by in some way taking in the matter coughed up and spit out by the consumptive, or coughed out with little drops of saliva, even when the patient does not spit.

Consumption can often be cured if its nature be recognized early and if proper means be taken for its treatment. In a majority of cases it is not a fatal disease.

It is not dangerous to live with a consumptive if the matter coughed up by him be promptly destroyed. This matter should not be spit upon the floor, carpet, stove, wall, or sidewalk, but always, in some sort of a cup kept for that purpose. The cup should contain water so that the matter will not dry, or better, carbolic acid in a five per cent watery solution (six teaspoonfuls in a pint of water). This solution kills the germs. The cup should be emptied into the water-closet at least twice a day, and carefully washed with boiling water.

Great care should be taken by consumptives to prevent their hands, face, and clothing from becoming soiled with the matter coughed up. Anything thus soiled, should be at once washed with soap and hot water. Men with consumption should wear no beards at all, or only closely cut mustaches. When consumptives are away from home, the matter coughed up should be received in a pocket flask made for this purpose. If cloths must be used, they should be immediately burned

on returning home. If handkerchiefs be used (worthless cloths, which can be at once burned, are far better), they should be boiled at least half an hour in water by themselves before being washed. When coughing or sneezing, small particles of spittle or mucus containing germs are expelled, so that consumptives should always hold a handkerchief or cloth before the mouth during these acts; otherwise the use of cloths and handkerchief to receive the matter coughed up should be avoided as much as possible, because it readily dries on these, and becomes separated and scattered into the air. Hence, when possible, the matter should be received into cups or flasks. Paper cups are better than ordinary cups, as the former with their contents may be burned after being used. A pocket flask of glass, metal, or pasteboard, is also a most convenient receptacle to spit in when away from home. Cheap and convenient forms of flasks, cups, and purses may be purchased at many drug stores. Patients too weak to use a cup should use moist rags which should at once be burned. If cloths are used they should not be carried loose in the pocket, but in a waterproof receptacle, which should often be boiled. A consumptive should never swallow his expectoration.

A consumptive should always have his own bed, and if possible, his own room. The room should always have an abundance of fresh air: the window should be open day and night. The patient's soiled wash, clothes and bed linen, should be handled as little as possible when dry, but should be placed in water until ready for washing.

If the matter coughed up be rendered harmless, a consumptive may frequently not only do his usual work without giving the disease to others, but may also thus improve his own condition and increase his chance of getting well.

Whenever a person is thought to be suffering from consumption the Department of Health should be notified. If the person has no physician, a medical inspector will call and examine him to see if he has consumption, and then, if necessary, will give proper directions as to treatment.

Rooms which have been occupied by consumptives should be thoroughly cleaned, scrubbed, whitewashed, painted, or papered before they are again occupied. Carpets, rugs, bedding, etc., from rooms which have been occupied by consumptives, should be disinfected. Such articles, if the Department of Health be notified, will be sent for, disinfected and returned to the owner free of charge, or if he so desire, they will be destroyed.

When consumptives move they should notify the Department of Health.

Consumptives are warned against the many widely advertised cures, specifics, and special methods of treatment of consumption. No cure can be expected except through the regularly accepted treatment, which depends upon pure air, an outdoor life, nourishing food, and continuous medical supervision.

Consumptives unable to pay a private physician will receive treatment (including medicines) free of charge

at the three special tuberculosis dispensaries of the Health Department (Manhattan, Fifty-fifth Street and Sixth Ave.; Brooklyn, 361 Jay Street; Bronx, Third Ave. and St. Paul's Place). To these dispensaries tuberculosis cases may also be referred by physicians, charitable organizations, and others.

In deserving cases, milk and eggs will be supplied. Pocket sputum cups can also be obtained there, and requests may be left for nurses to visit patients at their homes.

Persons desiring additional information or assistance should apply to the Department of Health, Sixth Avenue and Fifty-fifth Street, New York, the Association for Improving the Condition of the Poor, 105 East Twenty-second Street, or the Charity Organization Society, No. 105 East Twenty-second Street.

If the population for which the circulars are intended is presumably not able to read English, it is advisable to follow the example of the New York Health Department which has its popular circulars translated into such languages as Bohemian, Chinese, German, Hebrew, Hungarian, Italian, Polish, Ruthenian, Russian, etc.

To encourage the foreign population within the borders of the United States to study the health regulations in the language of their adopted country, the Health Department has the circular in English on one side of the page and in the lan-

guage of the country whence the new American citizen came on the other.

Besides this the most important educational leaflet, cards, folders, etc., in much more concise language, are issued by the department on which at the same time is printed a list of all the tuberculosis dispensaries of the city and a map showing where they are located:

CONSUMPTION.

HOW TO KEEP FROM GETTING IT
HOW TO KEEP FROM GIVING IT
DON'T SPIT

DEPARTMENT OF HEALTH
CITY OF NEW YORK.

HERMANN M. BIGGS, M. D.,
General Medical Officer.
THOMAS DARLINGTON, M. D.,
Commissioner of Health.

CONSUMPTION
IS CHIEFLY CAUSED BY THE FILTHY HABIT OF
SPITTING.
Take This Card Home
And Show It to Your Family, Friends, and Neighbors.

Consumption is a disease of the lungs, which is taken from others, and is not simply caused by colds, although a cold may make it easier to take the disease.

The matter coughed up and sneezed out by consumptives is full of living germs or "tubercle bacilli," too small to be seen. These germs are the cause of consumption, and when they are breathed into the lungs they set up the disease.

Don't Get Consumption Yourself.

Keep as well as possible, for the healthier your body the harder for the germs of consumption to gain a foothold. Every person should observe the following rules:

Don't live, study, or sleep in rooms where there is no fresh air. Fresh air and sunlight kill the consumption germs and those causing other diseases; therefore have as much of both in your room as possible.

Don't live in dusty air; keep rooms clean; get rid of dust by cleaning with damp cloths and mops.

Don't sweep with a dry broom.

Keep one window partly open in your bedroom at night, and air the room two or three times a day.

Don't eat with soiled hands: wash them first.

Don't put hands or pencils in the mouth, or any candy or chewing gum other persons have used.

Don't keep soiled handkerchiefs in your pockets.

Take a warm bath at least once a week.

Don't neglect a cold or a cough, but go to a doctor or dispensary.

On the back of this card a list of dispensaries is printed.

HOW TO GET WELL IF YOU HAVE CONSUMPTION.

If you or any one in your family have consumption, you must obey the following rules if you wish to get well:

DON'T waste your money on patent medicines or advertised cures for consumption, but go to a doctor or dispensary. If you go in time, you can be cured; if you wait, it may be too late.

DON'T drink whiskey or other forms of liquor.

DON'T SLEEP in the same bed with any one else and, if possible, not in the same room.

Good food, fresh air, and rest are the best cures. Keep out in the fresh air and in the sunlight as much as possible.

KEEP your windows open winter and summer, day and night.

IF properly wrapped up you will not catch cold.

Go to a sanatorium while you can and before it is too late.

The careful and clean consumptive is not dangerous to those with whom he lives and works.

Don't give consumption to others.

Many grown people and children have consumption without knowing it, and can give it to others. Therefore every person, even if healthy, should observe the following rules:

DON'T SPIT on the sidewalks, playgrounds, or on the floors or hallways of your home or school. It spreads disease, and is dangerous, indecent, and unlawful.

WHEN YOU MUST SPIT, spit in the gutters or into a spittoon half filled with water.

DON'T COUGH OR SNEEZE without holding a handkerchief or your hand over your mouth or nose.

Take this Card Home and Show it to Your Family.

The New York Health Department also issues a circular to physicians. I reproduce here part of this circular with some slight changes which seem to me advisable. The circular in this shape will, I hope, prove helpful in the crusade against tuberculosis as far as the profession is concerned.

First: Incipient tuberculosis tends to recovery.

Second: More advanced cases of tuberculosis may improve and life be prolonged and made useful by proper care and judicious and proper treatment.

Third: In all coughs which last more than a few weeks and which are not associated with asthma, emphysema, or cardiac diseases, tuberculosis is to be suspected as a cause.

Fourth: Successful treatment and prophylaxis demand the earliest possible diagnosis.

Fifth: The diagnosis of incipient pulmonary tuberculosis properly so called, is made positive when tubercle bacilli are found in the expectoration.

Sixth: Repeated examinations of the expectoration are frequently necessary to demonstrate

the presence of the tubercle bacilli in incipient cases of pulmonary tuberculosis.

Seventh: While the presence of tubercle bacilli in the sputum will confirm a physical diagnosis of tuberculosis, the absence of bacilli in the sputum does not exclude tuberculosis.

Eighth: In tuberculosis, suspected because of the result of a physical examination, the physician should not wait to inaugurate the preventive and curative measures until the appearance of the bacilli in the sputum.

Ninth: In order that the bacteriological examinations of sputa may be at the service of physicians in all cases, the Health Department is prepared to make such examinations, if samples of the sputa, freshly discharged, are furnished in clean, wide-necked, tightly stoppered bottles, accompanied by the name, age, sex, and address of the patient, duration of the disease, and the name and address of the attending physician.

Permanent tuberculosis exhibitions composed of charts, photographs, maps, models, diagrams, and all sorts of paraphernalia that have to do with the study, prevention, and treatment of tuberculosis, should be installed in all large cities. Thus, for example, a life-size model of a dark interior bedroom, dirty and crowded with furniture; and

FIG. 43. A section of the International Tuberculosis Exhibit held in New York, January, 1909, at the Museum of Natural History, showing exhibits of various states and countries.

adjoining it a similar room with open windows and clean cot spread with blankets, between which have been sewed newspapers as a cheap and at the same time warm covering, representing the change wrought by a visiting nurse, will be the best ocular demonstration of how to prevent and treat consumption.

The photographs here reproduced (Figs. 43 and 44) are illustrations of sections of the International Tuberculosis Exhibition which was held in New York recently, and which must be con-

FIG. 44. New York State Section of the International Exhibit.

FIG. 45. New Forms of Shelter for Consumptive Cases as Exhibited at the Dublin Tuberculosis Exhibition.

sidered one of the most successful ever held at any time or anywhere in the world. During its six weeks' stay in New York. the exhibition was visited by nearly a million people, men, women, and children, in all stations of life and from all parts of the city.

Fig. 45 shows a section of a local tuberculosis exhibition recently held at Dublin, Ireland.

As an educational measure, the New York Health Department imitated the open air lantern exhibit which originated with Dr. Oscar H. Rogers of Yonkers. During the summer of 1908 in twenty-five of the small parks of the city and at five recreation piers on the river front, there were shown, before crowds varying in number from several hundred to two or three thousand, a set of stereopticon slides giving in short sentences easily understood

advice in relation to tuberculosis. Interspersed with these sentences, pictures were thrown upon the screen which showed the ways in which the bacilli causing tuberculosis are transmitted by the cough and expectoration of those who have it; the effect of the disease on the lungs; how overcrowded, dirty, badly ventilated rooms and tenements cause and spread it; how these conditions are being remedied by the enforcement of better building laws; how the Department of Health renovates rooms infected with the germs of consumption by fumigation and the removal and disinfection of bedding and furnishings; how it cares for patients in the various hospitals; and finally, the possibility of arresting and curing many cases in country sanatoria.

Instead of giving a list of the very numerous slides which were exhibited in New York, I will give, as very suitable for imitation, a list of Dr. Rogers' 19 views. They are as follows:

1. Plan of a street in Yonkers showing infected houses.
2. Plan of another street in a different part of the city.
3. A graphic illustration of the mortality among people of various nationalities.
4. A graphic illustration of the mortality in various occupations.
5. A photograph of tubercle bacilli.
6. Section of normal lung showing air-vesicles.

7. Section of diseased lung showing tubercles.
8. A sketch showing infection through spitting.
9. A sketch showing infection through coughing (droplet infection).
10. Photograph of a gelatin plate infected by a fly which had just been walking in tuberculous spit.
11. A gelatin plate infected by bacilli expelled by a tuberculous patient in the act of coughing.
12. Photographs of various spitcups.
13. Dark, close room in a tenement, showing lounge on which a consumptive lay dying.
14. Same tenement with lounge near an open window and arranged by visiting nurse—an effective illustration of the value of the visiting nurse.
15. Home treatment on roof of tenement house.
16. Window-tent for use in home treatment.
17. Shack treatment as carried on at Liberty, N. Y.
18. Shack treatment as carried on at Wards Island, N. Y.
19. Model of inexpensive shack.

In the large centers of population, in fact, perhaps in all larger communities where there are a considerable number of poor or relatively poor people, the tuberculosis dispensary, or, at least, a special tuberculosis class in an ordinary dispensary, is one of the most important factors in the crusade against tuberculosis.

Let me state the object and purpose of a tuberculosis clinic as it has been set forth in the

first report of our Clinic for Pulmonary Diseases of the Health Department, prepared by its director, Dr. John S. Billings, Jr.

"It was early recognized that the establishment of a tuberculosis clinic or dispensary would be of great assistance in the attainment of the following desired objects:

"1. The Early Recognition and Accurate Diagnosis of Pulmonary Tuberculosis.—It is now generally admitted that tuberculosis is frequently a curable disease, and that incipient tuberculosis, under favorable conditions, tends to recovery; but to insure such recovery the diagnosis must be made at the earliest possible moment. Not only should careful physical examination be made, together with repeated sputum examinations as required in connection with the clinical history, but in addition, when necessary, the tuberculin test, X-ray examinations and radiography should be employed to assist in arriving at an early and correct diagnosis.

"2. The Intelligent Supervision of Patients Under Treatment.—This supervision should include not only hygienic and medical treatment, but also the furnishing of circulars in various languages, containing information as to the nature of the disease, and careful instructions as to the precautions necessary to be taken to prevent the infection of others. Paper sputum cups, paper handkerchiefs, and proper food (milk and eggs) should be supplied to indigent and needy cases.

"3. The Continued Observation of the Homes of Indigent, Needy, and Ambulant Cases, Including All

Those Discharged from the Public Institutions of the City.—A special staff of trained nurses should visit the patients at their homes to see that the instructions given are observed, that the sanitary surroundings are satisfactory, and to afford such assistance as is required. Suitable cases should be referred to the various charitable organizations for food, fuel, ice, etc. Special attention should be paid to the children in the families of tuberculous persons, and every effort made to prevent their infection.

"4. The Removal of Cases Requiring Such Care to Hospitals or Sanatoria.—These cases fall under four heads: (a) Advanced or bedridden consumptives, with profuse expectoration, who will not or can not take the necessary precautions against spreading the disease, and whose presence at home is a menace to others in the family; (b) consumptives who are able to get about, but who are unable to work and are entirely dependent upon their earnings for their livelihood; (c) incipient cases, who stand a good chance of recovery if removed to sanatoria outside of the city; (d) consumptives living in lodging houses, and those having no home.

"5. The Provision of a Municipal Institution to Which Cases of Tuberculosis May Be Referred.—(a) By physicians (indigent patients, etc.); (b) by institutions (on the discharge of consumptive patients from hospitals or sanatoria); (c) by the various charitable organizations throughout the city which keep tuberculous cases under observation; (d) by other persons doing individual charitable work who may come in con-

tact with such persons, and (e) by other city departments.

"6. The Extension and Strengthening of the Sanitary Control of Tuberculosis Among the Poor by the Department of Health.

"7. The Care of Laryngeal Cases.—The involvement of the larynx is one of the saddest complications of pulmonary tuberculosis, and the pain, distress, and discomfort of the patients are great. While the prognosis in these cases is extremely grave, yet under proper treatment recovery takes place in some instances, and in most the distress of the patient can, in some degree at least, be relieved. Special attention should be paid to such cases in a fully equipped throat clinic."

For communities which have not yet established a tuberculosis dispensary, the following suggestions for building and the description of an existing one may be of value. The ideal dispensary should be placed on elevated ground, in a locality where there is relatively little traffic, yet easy of access, and where the air is as pure as can be found within the city limits. Not all these ideal conditions existed when, in 1903, the New York Health Department decided to establish its first municipal tuberculosis dispensary. For obvious reasons the name "Clinic for Communicable Pulmonary Diseases" was decided upon. The lot being narrow, and between high structures, and

all the available ground space being required, windows could only be had on the ends. The building was therefore limited in height to one story, with a cellar below, in order that each room could be lighted by a ventilating skylight. (Fig. 46.) To ensure further ventilation square openings were cut high up in the walls of the various rooms, connecting them with each other and with the halls, and electric fans were installed in suitable places. The subdivisions are as follows: (1) entry; (2) registration room in which all applicants are received, their history taken and all records filed; (3 and 4) waiting room for male and female patients, each with its water-closet; (5 and 6) dressing rooms for physicians and nurses, each containing a closet for clothes, a washstand and water-closet; (7) throat clinic, with complete outfit, including compressed air spray apparatus, electric sterilizer for instruments, instrument cabinets, and full stock of all necessary instruments and apparatus; (8) X-ray room, the equipment of which consists of a twelve-inch coil with electrolytic breaks and micro-rheostatic control, Crookes tubes of several patterns and sizes, fluoroscopes, tube stands, examination table, supply and apparatus cabinet, etc. (a dark room for the immediate development of radiographic plates is located in the basement of the clinic, beneath

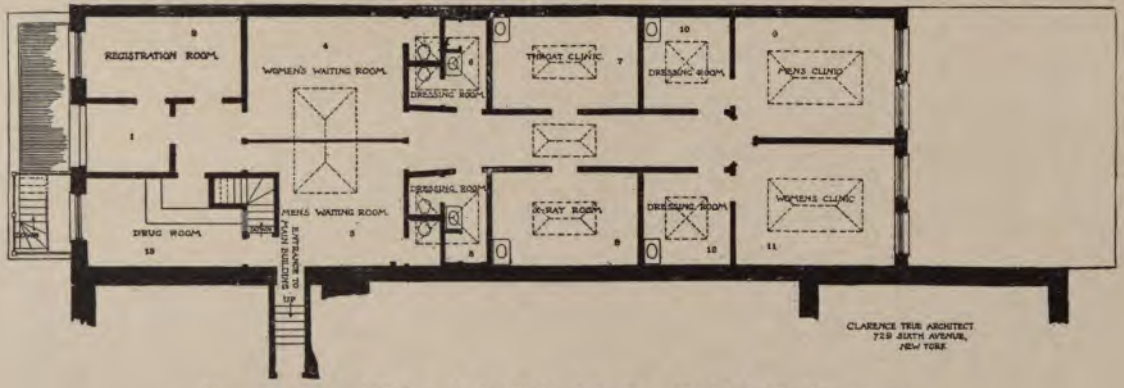

FIG. 46. Plan of Tuberculosis Clinic of the New York Health Department.

the X-ray room); (9 and 10, 11 and 12) male and female examination and patients' dressing rooms, containing desks, stools, etc., also a pneumatic cabinet for compressed or rarified air treatment; and (13) drug rooms, containing in enameled metal cabinets a full supply of all medicines furnished by the drug laboratory of the Department of Health. The floors are of cement and all corners and angles are rounded to prevent accumulation of dirt; all furniture is enameled metal. In the basement, lockers are placed for physicians' and attendants' gowns, individual stethoscopes, etc. The supplies (blanks, circulars, cards, etc.) of the clinic are also stored there. Large signs indicating that it is prohibited to spit on the sidewalk are placed at the entrance door of the clinic, and the following signboard in four languages greets the patient on his arrival in the waiting room:

Do not spit on the floor or in anything but in the brown paper envelope furnished for the purpose.

When you cough, hold a piece of muslin before your mouth; use the muslin also for wiping the mouth after spitting.

Men are forbidden to smoke or wear their hats while in the Clinic.

Because of lack of room, we had to content ourselves with one door. Whenever it is feasible, I

would recommend having two doors, one for the entrance and one for the exit of patients.

To avoid multiplication of efforts, that is to say, to prevent patients from applying to several dispensaries at the same time for medical advice, medicine, and food in any city where there are two or more of such institutions, there should be coöperation between these dispensaries. If it is possible to divide the city into certain districts with dispensaries located in each, the work will be all the more easy. This is done in New York. A patient living in Harlem, even if he applies to a down-town dispensary, will be referred to the up-town institution and vice versa.

The municipality will not be able to do effective work in the prevention of tuberculosis unless it makes provision to examine all the members of a family who live with a consumptive. This is particularly important when there are children in the family. Through this careful examination of all members of any family, likely to be exposed to contracting tuberculosis or having already contracted it, the greatest amount of preventive treatment can be inaugurated.

Every municipality should have sufficient hospital and sanatorium facilities to treat the consumptive poor, adults and children who are in need of institutional treatment. To this end,

every large city should have a hospital, located at not too great a distance from the city, where all cases of tuberculosis referred by private practitioners or dispensary physicians could be received at once. There they should remain for a definite time, sufficiently long for the visiting or house physicians to determine whether it would be better for the patient to remain there, return home to relatives and friends, or be sent to a sanatorium at a greater distance from the city for the purpose of completing the cure. From the sanatorium where the patient's disease is cured or arrested, he should not at once be permitted to return home to his former environment and occupation where or wherein he contracted the disease, but he should be given an opportunity to make his cure more lasting. To this end municipalities should have agricultural and horticultural colonies where the patient should gradually become accustomed to harder work without the fear of a relapse.

Besides these three kinds of institutions, every large city should have a special hospital or sanatorium to accommodate the children suffering with diseases of the bones and glands, and those suffering with pulmonary diseases. To this institution might well be added a division for the care of those children of the consumptive poor who, if they were to remain at home, would be likely to

contract the disease from their parents. The latter division might justly be called "preventorium."

Whether or not these three institutions for children can be combined in one, with a pavilion for each kind of cases, or whether each institution should be located separately, will largely depend upon the size of the community and the number of tuberculous children in need of care. While it is now generally conceded that tuberculosis of the bones and glands in children is very successfully treated at the seaside (Fig. 47), for the comfort of the inland communities it may be said that sanatoria located in any healthy region are just as successful in the treatment of tuberculous children. (Fig. 48.) Almshouses and orphan asylums, by reason of overcrowding and the commingling of the tuberculous with the non-tuberculous inmates, very often become centers of infection. The examination for tuberculosis of all inmates of such institutions and their periodic reëxamination, the isolating of the tuberculous from those not affected and the treatment of the former according to the best and most approved methods in the same institution but in different rooms, when it is not possible in special tuberculosis institutions, is a duty that must not be neglected.

It is most important for every municipality to remember that a single anti-tuberculosis measure,

FIG. 47. A porch of the Seabreeze Sanatorium, for children suffering with surgical tuberculosis, at Coney Island, N. Y. Established by the Society for Improving the Condition of the Poor, now maintained by Mr. John D. Rockefeller.

while it may be useful in one direction, will not be sufficient to solve the many phases of the problem presented in every large city. It requires a chain of institutions; a health department, to educate the masses and control all existing cases; dispensaries, to furnish treatment and care to cases among the consumptive poor which can or need not be received in the hospitals and sanatoria; reception hospitals, to serve as a sort of clearing house for

FIG. 48. Inland Sanatorium. Country Branch of the N. Y. Orthopædic Dispensary and Hospital at White Plains, New York. Acute cases of joint tuberculosis "doing cures" in midwinter.

hospital and sanatorium cases where all bed cases can be received; and a sanatorium or sanatoria at a greater distance from the city, for the earlier and more curable cases of adults and children. Besides this, there should be a disinfecting station or bureau for the purpose of rendering clean and sanitary the premises occupied by the tuberculous and also their bedding or personal property.

A municipality having such a chain of institutions and a wide-awake health department with police power as the first link, will not only master and control tuberculosis within a comparatively

short time, but will also in the end be the moral and financial gainer. The Riverside Hospital-Sanatorium having 300 beds for indigent male and female consumptives, receives, besides the few forced-in cases, annually a large number of New York's consumptive poor in the second and third stages of the disease. When they improve sufficiently they are transferred to the Health Department's Country Sanatorium at Otisville, N. Y. To this latter institution, with a capacity of 250, early and seemingly curable cases are sent directly from the various dispensaries of the city. A goodly number return from Otisville annually completely cured or with their disease sufficiently arrested so that they can again resume work.

Thanks to its police power, the New York Health Department has a right to remove to its Riverside Sanatorium on North Brother Island any individual suffering from tuberculosis who constitutes a menace to his family or friends. The patient is retained at this institution until he is cured or more sanitary arrangements have been made at his home. These so-called forced-in cases very soon become docile patients and learn to appreciate the care bestowed upon them. The accompanying picture (Fig. 49) shows a group of the North Brother Island patients taking respira-

tory exercises under the direction of the physicians in charge.

To be convinced that from these methods a financial and moral gain accrues to the community, one only needs to remember that when a patient is taken hold of in the early stage of his disease he has a good chance to be cured within one year, at little more than he would cost the community for a year in an almshouse, a general hospital, or at home when he or his family had to be supported. The only difference is that he may linger at home or in the almshouse an invalid for several years and never get well, and before his demise may have infected all his children, his wife, and other relatives and friends who may have come in close contact with him. Let us take, for example, a community which has 10,000 consumptives absolutely poor. They will sooner or later have to be taken care of by the municipality either in the almshouse, general hospital, or their own homes. They will cost at the lowest possible rate in a general hospital $7,500 a day, or $2,737,500 a year. In the almshouse, where no tuberculous patients should ever be, they will at least cost $5,000 per day, or $1,725,000 a year. They are apt to linger at least two years deprived of their earning capacity and, even if they stay at home, when the consumptive is the breadwinner, the

FIG. 49. Patients Taking Breathing Exercises Under the Direction of the Physicians at Riverside Hospital Sanatorium of the New York Health Department.

expense of maintaining the family is likely to be even higher than the maintenance of the individual in hospital or almshouse.

Now, it has been demonstrated that with judicious administration and economy a consumptive can be maintained and treated in a sanatorium at $1.00 per day. His chances of cure there are at least 75 per cent. Thus, the cure of 7,500 consumptives would cost the city, even if the cure should take a whole year, $2,737,500. Not cured, they would cost the city at least twice the amount, that is to say, $5,575,000. The remaining 2,500 cases not cured, will probably cost the city $912,500 for two years. Of the latter many will return to their homes, if not cured, at least temporarily improved, educated in the prevention of tuberculosis, general hygiene, and personal cleanliness, and by their training will become veritable missionaries in the crusade against tuberculosis. Thus, taking care of 10,000 consumptive poor at the right time, at the right place and in the right way: that is to say, in the sanatorium, in the early and curable stages of the disease, by the most approved methods at the hands of experienced phthisiotherapeutists, will cost a total of $3,650,000. Not curing the 7,500 nor taking proper care of the rest, will cost the community $5,575,000. Thus, by directly saving the lives of 7,500 people, the community

has saved $1,925,000. The number of other valuable lives which will have been saved by the isolation of the patients in the proper institutions can hardly be calculated when we remember that the careless individual can expectorate seven billion bacilli in 24 hours, and that it only requires the inhalation or ingestion of a few bacilli by the predisposed individual to cause a typical pulmonary tuberculosis to develop in a relatively short time, making him again a center of infection, and so *ad infinitum.*

Consumption is a disease which usually attacks an individual at a time of life when he is most useful and most productive, and the economic loss to the community is naturally correspondingly great when it fails to do its duty towards its consumptive poor.

The municipality which is in earnest to wipe out tuberculosis from its midst must also make provisions which tend to improve the general health of its inhabitants, especially that of its children. There should be plenty of parks and playgrounds, public baths, swimming pools, and gymnasiums. In regard to the need of playgrounds in cities, in the interest of the health and morals of our children, the accompanying picture, "Boys without a playground," (Fig. 50) will speak for itself. Parks are the lungs of a city.

FIG. 50. Boys Without a Playground.

The larger and more numerous they are, the purer will be the air which the inhabitants will breathe. Playgrounds, swimming pools, and gymnasiums tend to make the young more resistant to disease, and particularly to tuberculosis.

A city government, of course, always has its courthouse and the offices of its various administrations. These offices should be models of ventilation, proper heating, and lighting. Anti-spitting ordinances should be enforced in municipal buildings more strictly than anywhere else. Every officer and employee of the city government whose duties are within doors where, if tuber-

culous, he might infect some one else, should be excluded from office duty or indoor occupation. All city officials should be examined for tuberculosis on entering the employ of the government and should be reëxamined for tuberculosis at least once a year. The civil service examination of all city employees should include questions on the simple principles of hygiene and the prevention of tuberculosis, and a candidate not able to answer the questions satisfactorily should be refused employment until he has mastered these subjects.

If a municipality wishes to combat all possible sources of tuberculosis, it must, of course, see that the inhabitants are provided with pure milk, free from tuberculous and other germs. The surest way of having pure milk is to watch over its source, its transportation, its preservation, and its methods of delivery. Farms and dairies should be inspected, and cows found tuberculous on physical examination or by tuberculin test should be purchased by the state or municipality and disposed of by them. An efficient health department will have visiting milk inspectors who will also see that cows and stables are kept clean and that wholesale and retail milk dealers handle the milk in such a way that infection is made virtually impossible. It has been shown by the health departments of a number of American cities, such

as New York, Chicago, Rochester, and others, that a great deal can be done in this direction and that a city can be supplied with good, pure milk. In the opinion of such authorities as Health Commissioner Darlington of New York, Health Commissioner Evans of Chicago, and Health Officer Goler of Rochester, the methods of supervision of the milk supply such as are in vogue in their cities are superior to sterilization. According to the Year Book of the U. S. Department of Agriculture, it was demonstrated at the competitive exhibit of milk and cream at the National Dairy Show in Chicago in February, 1906, which was in charge of the Dairy Division, that milk and cream produced under sanitary conditions could be shipped long distances and kept sweet for several weeks, without any other means of preservation than cleanliness and low temperature.

In Chapter II we emphasized the fact that pasteurized milk is inferior in digestive and nutritive qualities to raw, fresh, pure milk. One of the chief objections to general and commercial pasteurization, as has been stated by Dr. M. J. Rosenau, Director of the Hygienic Laboratory of the United States Public Health and Marine Hospital Service, is that such a practice might promote carelessness and discourage the efforts to produce clean milk. It is believed that the gen-

eral adoption of pasteurization would set back improvements at the source of supply, and encourage dirty habits. It would cause the farmers and those who handle milk to believe that it is unnecessary to be quite so particular, as the dirt that got into the milk would be cooked and made harmless. It would be well if every community could have a committee to teach mothers the importance of nursing their babies and, in the event of their being unable to do so, to teach them how to modify and prepare cows' milk at home.

All slaughter houses should be inspected to prevent the sale of tuberculous or otherwise infected meat.

A very important duty of every health department, be it of a city, town, or village, should be the sanitary supervision of places of amusement, of popular, and even of religious instruction. A theater, a music hall, a dance hall, a lecture room, or a church has no right to exist if its bad ventilation, bad or dangerous lighting arrangements, or lack of provision against fire make it a menace to the health and life of the audience, performers, or speakers. I am convinced that a thorough airing after each performance and a thorough cleaning by the pneumatic process of floor and furniture of every theater, church, or assembly hall, would remove many sources of

direct and indirect infection, not only from tuberculosis but from other communicable or contagious diseases of the respiratory organs.

There are in every community a number of tuberculous individuals employed in occupations which are not suitable for them, and where their presence is in some degree dangerous to the community at large. I refer to bakers and confectioners, milk, fruit and vegetable dealers, and butchers. The community which will insist that any one following these occupations must have a clean bill of health will make another step toward the prevention and eradication of tuberculosis.

What has always seemed to me rather unclean and unhygienic is the way in which bread is almost universally handled. We have already referred to the possibility of infection from a tuberculous baker, but the danger does not end there. The probability of infection is still more evident when one considers through how many hands the bread passes before it enters the mouths of the consumers, and that, probably, nobody ever thinks of cleaning bread before eating it. A very recommendable practice is now in vogue in some large bakeries in connection with the handling and transporting of bread. The moment the bread comes out of the oven, while it is still too hot to be handled, it is placed, with the aid of a shovel,

upon a piece of wrapping paper large enough to envelop the whole loaf. By twisting the two ends of the wrapper the bread is completely enclosed.

There are also other sources of possible infection which could be prevented by care and municipal supervision. Thus, for example, it should be against the law to expose candy for sale uncovered. This law should not only be applied to the small candy dealer or peddler, but also to the fashionable confectionery stores or department stores. The dust floating in the air of a store, whether large or small, is apt to be infectious and should not constitute a part of our food.

CHAPTER VII

THE DUTIES OF FEDERAL AND STATE AUTHORITIES IN THE COMBAT OF TUBERCULOSIS

City, state, and federal governments must work hand in hand if tuberculosis as a disease of the masses is effectually to be combated. What has been said of the establishment of institutions for the tuberculous may devolve upon the legislators of the state. Thus, it may often be of mutual advantage to have a state institution to which all the cities and counties of a state can send their incipient tuberculous cases. Such an institution, most properly called a sanatorium (from the Latin word *sanare*, to heal), is usually situated so that it can be easily reached from the greater centers of population. While high altitude and climatic advantages naturally favor the cure of tuberculosis, these factors are by no means indispensable.

In the maxims on climatology we stated that since the majority of the tuberculous poor are from the laboring classes, they should, as far as possible, be treated in the same, or nearly the same climate where they will have to live and

labor after their restoration to health. While the cure in such a home climate is apt to take a little longer than in regions renowned for their particularly congenial climate, the patient's chances for remaining cured are greater. This is certainly the experience of the majority of phthisiotherapeutists.

The sanatorium which is to do the greatest amount of good to the largest number of people should not be more distant from the center of population than three to five hours by rail. It should be in a region known for the relative purity of its atmosphere where there is freedom from injurious gases, smoke, and dust. If possible, it should be where the extremes of temperature are not too pronounced and, if the region is a mountainous one, at an altitude of from five hundred to fifteen hundred feet. The site should be a pleasant one, with a southern exposure, and protected from cold winds by higher mountains and woodlands (pine-woods should be given the preference). The ground, of course, should be dry and porous.

As will have been seen from our maxims on climatology just referred to, it is not absolutely necessary to fulfill all these conditions. What is essential is the careful outdoor life, the judicious use of cold water, plenty of good, plain, and nu-

tritious food, and constant medical supervision. If the choice had to be made between sending a patient to what is usually considered an ideal or specific climate, where he would not have any guidance or supervision but would do as he happened to please, or keeping him at home in a fairly pure atmosphere and applying the hygienic and dietetic treatment under constant medical supervision, I should choose the latter method of treatment and think the patient had a far better chance of recovery.

After a state legislature has provided a sanatorium for its consumptive poor and those of moderate means, it becomes its duty also to see that pauperization is avoided. All persons seeking admission to a state sanatorium should be visited by local agents who should determine whether the patient is able to pay all or only a part of his expenses during his stay at the sanatorium. The first state sanatorium was established in the United States by the commonwealth of Massachusetts in 1895, and opened to patients in October, 1898. (Fig. 51.) It is located near the center of the state, at Rutland, Mass., about fifty miles from Boston and eleven miles from Worcester, at an elevation of 1,200 feet. The buildings are on a southern slope, protected on the northwest by a wooded hill. The pavilions for the patients are

FIG. 51. First State Sanatorium Erected in the United States, Located at Rutland, Mass.

one or two stories high, extending to the south, each terminating in a solarium and piazza (Fig. 52) and all connected on the north by a covered corridor.

The primary object of the institution is the arrest of the disease, and only such patients will be admitted as are deemed not too far advanced for a reasonable hope of radical improvement; the purpose being to give sanatorium treatment only.

Residents of Massachusetts only are admitted, preference being given to citizens of the United States. Patients who do not improve after a stay in the Sanatorium sufficiently long to test the effect of treatment will be advised not to remain, and their friends will be expected to arrange their removal. In consideration of the nominal charge made for board and treatment, all patients who are physically able are expected to do some work daily under medical supervision. The institution has a capacity for 400 patients and the uniform charge is $4.00 per week, which covers less than half of the actual expense for each patient. It is difficult to estimate the great value of such a state institution in the warfare against tuberculosis. Leaving aside the great number of actual cures and the great educational influence such an institution exerts, many patients returning improved to their

FIG. 52. Patients of the Massachusetts State Sanatorium Taking the Open Air Cure at a Temperature Below Zero.

former environments become what might be termed economic cures. In the interesting volume prepared by the Tuberculosis Committee of the state of Massachusetts for the International Tuberculosis Congress held at Washington last year, is quoted a table of comparative results expressed in percentage for the first 8 years of the Sanatorium's activity. These tables are most instructive. They read as follows:

COMPARISON OF PERCENTAGE IN THE FIRST, SECOND, THIRD, FOURTH, FIFTH, SIXTH, SEVENTH, AND EIGHTH YEARS

	1898 to 1899	1899 to 1900	1900 to 1901	1901 to 1902	1902 to 1903	1903 to 1904	1904 to 1905	1905 to 1906
Per cent of "arrested" or "apparently cured" cases	34.28—	42.35	46.12	48.31	48.97	44.8	33.7	39.1
Per cent of all classes of "improved" cases	39.36—	44.70	47.64	44.51—	33.0—	47.7	58.9	52.1
Per cent of "not improved" cases	26.04—	12.95	5.74	6.73—	7.90—	7.4	7.4	8.8

PERCENTAGE OF INCIPIENT CASES "ARRESTED" OR "APPARENTLY CURED"

	1898 to 1899	1899 to 1900	1900 to 1901	1901 to 1902	1902 to 1903	1903 to 1904	1904 to 1905	1905 to 1906
"Arrested" or "apparently cured"	64.60	72.90	73.00	72.00	72.60	75.8	64.2	74.4

"A quotation from a study of the subsequent histories of patients who had left the Sanatorium, taken from the ninth annual report of September 30, 1905, is also added.

"*Subsequent Histories to Date* (*Oct.* 1, 1905) *of Former Patients of Both Departments Treated in the Sanatorium Previous to October* 1, 1904.

"The subsequent histories of former patients make the crucial test of any method of treatment, and are of vital importance.

"For the first time in the history of the Sanatorium, tabulations of the results of former treatment have been made with painstaking care, and are hereby appended. That they give us convincing proof of the value of the work at Rutland during the last six years we think no one can deny.

Total number treated		2,200
Able to work	1,179	
Not able to work	34	
No reply to letter	377	
No trace	49	
Dead	561	
	2,200	
Total number of "arrested" and "apparently cured"		989
Able to work	743	
Not able to work	14	
No reply to letter	139	
No trace	19	
Dead	74[1]	
	989	

[1] Four have died from causes other than tuberculosis.

"In reading these figures, it must be remembered, moreover, that failure to receive replies or inability to trace the patient does not mean necessarily that the result has been unfavorable. In many of the earlier cases we have failed to receive news for months after the first inquiries have been made. Oftentimes, too, favorable accounts have been received of former patients through others. It is reasonable to suppose, therefore, that many of those from whom we have not heard as yet are still alive and at work."

There are now many states which have followed the example of Massachusetts. To statesmen, legislators, and also to private citizens a short description of the existing state sanatoria, of where they are situated and how they are managed, will prove of interest; and I trust that to those in whose state there is as yet no provision for the tuberculous, this splendid array of existing institutions will be an incentive to emulation.

According to the latest directory of our National Association for the Study and Prevention of Tuberculosis, the following states have state sanatoria for consumptives.

District of Columbia: "Tuberculosis Hospital of the District of Columbia," 14th and Vanness Sts., N. W. (opened July 1, 1908). For indigent consumptives in all stages of the disease. Capacity 120 beds. There are no charges.

The grounds of the Sanatorium comprise a plot of 30 acres, overlooking the City of Washington. Two car lines run within three blocks of the institution.

With the opening of this hospital, the special building at the Washington Asylum Hospital was closed. The new hospital is the only place in the district for the accommodation of consumptive patients. Application should be made to the Board of Charities of the District of Columbia.

IOWA: "State Sanatorium for the Treatment of Tuberculosis" (opened February 1, 1908). For the treatment of incipient cases or those who offer a fair chance of recovery. Capacity: 80 beds. Rates: $30 per month, for those who are able to pay; otherwise expenses are paid by the state.

The Sanatorium is located five miles northwest of Iowa City, directly on the Cedar Rapids and Iowa City Electric Interurban Railway. The site, which consists of 280 acres, is of a comparatively high altitude, affording good drainage facilities. The farm will be utilized for the growing of vegetables, fruits, etc.

The buildings consist of a three-story brick administration building, two large pavilions, a power house, and laundry. In the administrative build-

ing are rooms for the superintendent, the nurses and other employees, as well as offices, laboratory, dining room, kitchen, and an amusement room with open fireplace. The pavilions consist of a central building with rooms for nurses, diet kitchen, bath and toilet rooms. There are wings on either side containing ten rooms for two patients each, and in front is a twelve-foot open porch. Accommodations are thus afforded for eighty patients, and the state will doubtless increase the capacity as the exigencies require.

Application should be made to the examining physicians of the different counties, who fill out admission blanks and send them to the superintendent who, in turn, decides on the suitability of the applicant.

MARYLAND: "The Maryland State Sanatorium" (opened in the summer of 1908). For all classes of tuberculosis which are deemed curable. White persons only admitted. Capacity is now about 100; full scheme provides for 250. Rates: 50 cents per day. Free cases will be received only after approval of trustees.

This Sanatorium is the outgrowth of the labors of the Second Tuberculosis Commission of Maryland, appointed in 1904. Up to April 1, 1908, most of the $100,000 originally appropriated had been expended. The Legislature of 1908 appro-

priated $175,000 more to complete the institution, which will doubtless be one of the finest state sanatoria in the United States.

Sabillasville is located in Frederick County in the heart of the Blue Ridge Mountains at an elevation of 1,500 feet. The site comprises 198 acres. The detached pavilion system of building is being employed. Each cottage will be sufficiently far removed from all others to give it plenty of air and sunlight. The cottages will each accommodate sixteen patients.

Application blanks for admission may be obtained from the municipal or county health officer in the district in which the applicant lives, or by writing to any member of the Board of Directors. Applicants must have been residents of the state of Maryland for at least one year preceding the date of the application.

MICHIGAN: "Michigan State Sanatorium" (opened September 1, 1907). For incipient cases only. Capacity: 38. Rates: $1.00 per day; $7.00 per week. Those unable to pay are cared for as state and county charges.

The Michigan State Sanatorium was established by a special act of the Legislature in 1905 "for the treatment of such persons as shall be proven by proper bacteriologi-clinical examination to be suffering from tuberculosis."

The Sanatorium is situated two and one-half miles southwest of the village of Howell, Livingston County, at the highest point of the natural watershed of the lower peninsula, and is approximately 1,100 feet above the sea-level. The property consists of 270 acres, 192 of which was given to the state by the citizens of Howell, the money being raised by popular subscription. It is of a rolling, sandy loam, well adapted for the growing of fruits and vegetables, and permits, from a sanitary point of view, of the best possible drainage. An admirable water-supply is secured from a series of natural springs on the property, and, by pumping this into an elevated reservoir, ample pressure is afforded for all practical purposes as well as protection in case of fire. A superior quality of ice is also secured from a small lake at the main entrance fed by these same springs.

The Sanatorium proper consists of an administration building, around which is grouped a number of shacks. The administration building contains the dining hall, offices, laboratories, kitchen, laundry, staff and help quarters, and two infirmary wings accommodating ten patients each. The infirmary wings, which are provided for patients requiring special care and nursing, are so constructed as to give perfect ventilation and allow each patient the privacy of his own bedroom and

the opportunity to sleep out of doors on a sheltered veranda if advisable.

Application should be made on printed blanks to the superintendent through a regular examining physician.

MINNESOTA: "State Sanatorium for Consumptives" (opened January 1, 1908). For persons in the early stages of pulmonary tuberculosis who have been residents of Minnesota for at least one year. Capacity: 60. Rates: $7.00 per week. No free beds, but county and city officials pay expenses of some patients.

This Sanatorium is the result of the labors of a commission, appointed under an act of the Legislature of 1901, to study the tuberculosis question. This same commission was later, in 1903, instructed by the Legislature to erect a sanatorium, the state appropriating $25,000 for this purpose.

A location was selected near Leech Lake in Cass County, 740 acres of land were procured, and the institutional buildings begun. Two cottages and one of the wings of the main building were ready for occupancy on January 1, 1908. It is near the town of Walker, on the Minnesota and International Railway, 200 miles due north of St. Paul. The lake, which furnishes an excellent water-supply, is a quarter of a mile distant and about 200 feet below the buildings so that the dampness from

the water will not reach the patients. The sandy soil allows excellent drainage. Railway facilities are nearby, the sanatorium station being on the grounds one-half mile distant from the building. There is an admirable opportunity for gardening and grazing, making possible the production of vegetables, milk, and eggs for use in the sanatorium.

The buildings are planned especially for the carrying out of the open air treatment. The present main building is but a part of the general plan and has been adapted to present needs, containing the dining room, kitchen, laundry, apartment for superintendent, rooms for other employees, and a ward each for men and women patients, with locker rooms and excellent bathing facilities. The piazzas are sufficiently large for all patients to sit out at one time, and are thoroughly screened. The two cottages are erected on the plan of the open air "lean-to," used at other sanatoria. Each has a central section, heated and containing a sitting room and a bath room well equipped, including shower baths and lockers; and a sleeping pavilion extending out on either side, open to the south, screened and provided with canvas curtains to be used during inclement weather. Patients sleeping in the pavilions are practically out of doors.

Application should be made to the local medical examiners in various parts of the state or to any of the city or county officials of the poor.

MISSOURI: "Missouri State Sanatorium for Incipient Pulmonary Tuberculosis" (opened August 1, 1907). For incipient cases only. Capacity: 50. Rates: $5.00 per week for county patients; $50 a month for private patients.

The Missouri State Sanatorium for Incipient Pulmonary Tuberculosis is located in Mount Vernon, twelve miles from Aurora and sixty miles from Springfield, on a branch of the Frisco railroad extending from Greenfield to Aurora. The Sanatorium is situated on a bluff, with an altitude of 1,400 feet above sea-level.

The plans of the architect call for a group of twelve or fifteen buildings. There are to be eight villas, which will be for the use of patients. Four will be for women and four for men. The villas are one story in height, so that a thorough system of ventilation can be installed, and so that patients will not need to climb stairs.

Each villa accommodates twenty-four patients. When entirely completed, the sanatorium will have a capacity for 200.

Applications should be made to the superintendent through the local medical examiners.

NEW JERSEY: "New Jersey Sanatorium for Tu-

berculous Diseases" (opened October 25, 1907). A state sanatorium for cases of a curable nature. Capacity: 104. Rates: $5.00 per week. Patients are admitted without charge whose inability to pay $5.00 a week is determined by a competent court.

The New Jersey State Sanatorium for Tuberculous Diseases is located at Glen Gardner, Hunterdon County, on the Central Railroad of New Jersey, fifty-two miles from New York and sixteen from Phillipsburg, about 1,000 feet above sea-level. The site of the Sanatorium is on the slope of a mountain where the state has acquired 600 acres. The slope has been cut away and leveled for a considerable space, and here the buildings are constructed.

The buildings consist of a service building, administration building, and east and west wards. The service building is 84 by 110 feet, three stories, including basement, in which is the engine room and electric-light plant. Two boilers of 125 horse-power each, furnish steam to run the dynamos, and the exhaust steam is utilized for heating the building.

All the buildings are built of field stone, stuccoed on the outside and finished with white plaster in the interior. The floors are of hard maple and concrete, and the trimmings are of poplar. Each building has its own heating apparatus. Bath and

FIG. 53. Winter View of the New York State Hospital for Incipient Tuberculosis at Ray Brook, N. Y.

toilet rooms are located on each floor, with special shower baths on the second floor of the ward building. The buildings are so constructed that additions may be made.

The buildings are erected on the southern slope of the hill and are protected from northwesterly winds by thick forests on the north and west sides. These forests in the future will be converted into parks with shaded walks and drives. The grounds are spacious; tents and wooden shacks for summer can be added as they are required.

Application for admission should be made to any one of the local medical examiners who reside in any of the principal cities of the state.

NEW YORK: "State Hospital for the Treatment of Incipient Pulmonary Tuberculosis," Fig. 53 (opened July 1, 1904); situated at Ray Brook,

Essex County. Primarily for the poor, but pay patients will be received when there is room for them; one year's residence in this state is a required condition. Incipient cases only are admitted. Capacity: 120.

By a provision of its charter, the hospital is required to give preference to the indigent, admitting others only when vacancies occur. The authorities by whom the patients are sent, are required to pay transportation to and from the Hospital and $5.00 per week for maintenance.

The State Hospital is located in the Adirondacks, four miles southeast of Saranac Lake and six miles west of Lake Placid. There is an administration building, with a pavilion on each side connected with the central building by wings to be used as sun rooms. The 516 acres of land adjoin the Forest Preserve. The altitude is 1,625 feet.

Application should be made to the nearest public authorities having charge of the relief of the poor, or to the official medical examiners, whose names may be obtained from the superintendent.

NORTH CAROLINA: "The North Carolina State Tuberculosis Sanatorium" (opened August, 1908). For incipient cases only. Capacity: 30. Rates: $10.00 per week, or actual cost of maintenance.

The site of the new State Sanatorium of North Carolina comprises 936 acres of land, situated in a

dry, sandy country at an elevation of 650 feet. The Sanatorium buildings are located on a plateau of about 200 acres. The site provides plenty of land for reservation purposes, a good farm, an abundance of fuel, and water for motive power.

The buildings are on the cottage plan, being 18 by 40 feet in dimension, and provided with piazzas 14 feet wide. The capacity of the institution will be enlarged as occasion demands. It is the intention of the directors to establish a camp about a half mile from the main building, where patients may be able in part to care for themselves at $7.00 per month. Application should be made to the superintendent.

OHIO: "Ohio State Sanatorium" (opened January 1, 1909). For incipient cases only. Capacity: 220. Rates: $5.00 per week. Ten per cent of the cases may be taken free or at a reduced rate.

The site of the Ohio State Sanatorium, at Mount Vernon, comprises 335 acres of fertile, porous soil; 125 acres of woodland. Two large springs, with a daily capacity of 250,000 gallons, furnish water for the Sanatorium. The site is two miles from the city of Mount Vernon, near the center of the state. The capacity for 100 patients was provided in January, 1909. The completed plans call for more than double this number of beds.

Dr. C. O. Probst advocated paying $5 a week to patients doing work, as an inducement to stay and make their cure more complete.

PENNSYLVANIA: "Pennsylvania State South Mountain Sanatorium" (opened in 1908). For citizens of Pennsylvania suffering from pulmonary tuberculosis and unable financially to go to private sanatoria. Capacity: 350. There is no charge except for laundry, the washing being for the present done at neighboring farmhouses. Patients are expected to pay for their own transportation and to come well supplied with clothing. Shelter and food are entirely free.

This Sanatorium was made possible by an appropriation of $600,000 by the Legislature of 1907. It includes and supersedes the small South Mountain Camp Sanatorium, formerly conducted by the Commissioner of Forestry, and also the private Sanatorium of the Doctors Rothrock. The site which includes about 600 acres is in the heart of the Blue Ridge Mountains, on land formerly set apart by the Forestry Commission. The grounds include abundant water-supply and facility for water-power, sewage, and drainage.

As soon as the money for this institution was made available, in June, 1907, work was at once commenced, and by August 1, 1908, the Sanatorium had accommodation for 350 patients. The

permanent unit of the Sanatorium will be a frame cottage with the dimensions 27 by 24 feet, accommodating two persons in each of the four equal-sized rooms. The cottages will be one story high with an air space for ventilation, and will be so arranged that they can be thrown open to the air, but protected from violent storms when necessary. The heating will be by stoves, and the roofs built of asbestos shingles as a safeguard against fire. The cottages will be twenty-five feet apart and the streets will be fifty feet wide.

Dining rooms will be in common, one for each four hundred patients. There will be bath houses provided with spray, douche, and shower baths, but no bath tub.

Dr. Samuel G. Dixon, State Commissioner of Health, says: "It is anticipated that the South Mountain Sanatorium will in a few years have a capacity of three thousand patients."

Application should be made to the County Medical Examiner in the district where the patient lives.

RHODE ISLAND: "Rhode Island State Sanatorium" (Fig. 54), for incipient and early cases of tuberculosis. Capacity: 110. Rates: $5.00 per week. Trustees may admit patients free of charge.

The State Sanatorium is located at Wallum

FIG. 54. Rhode Island State Sanatorium, Situated at Wallum Lake, R. I. Only Residents of Rhode Island Are Admitted.

Lake, 650 feet above sea level, in the northwestern corner of Rhode Island, on the Providence to Southbridge branch of the N. Y., N. H. & H. R. R.

The institution is built on the ward plan and has a capacity of 110 beds. As the Sanatorium is designed for the treatment of early cases, only those patients are admitted who present a reasonable prospect of arrest or cure, and patients who fail to improve after admission will not be kept indefinitely. The charge is $5.00 weekly, payable in advance, but the Board of Trustees has authority to admit patients free of charge.

Dr. H. L. Barnes, who is in charge of the institution, remains in touch with the physicians who send patients there, not only while they are in the institution but also afterwards.

WISCONSIN: "Wisconsin State Tuberculosis Sanatorium" (opened November 7, 1907). For incipient and moderately advanced cases of tuberculosis. Capacity: 80. Rates: $10.00 per week for those able to pay. Others are admitted free, as county charges.

Wales, near which the State Sanatorium is located, is on the Madison division of the Chicago and Northwestern Railroad, 28 miles west of Milwaukee and 54 miles east of Madison.

The five buildings which comprise the sana-

torium are about two miles from Wales, at an elevation of 600 feet above sea-level. All of the service buildings, except the administration building, are of the "shack" type of construction. High mountains on every side surround the Sanatorium and shut off the cold winds. When entirely completed, the institution will cost $120,000.

Application for admission must be made by examining physicians to the superintendent. In the case of indigent patients, admission is by order of the county judge.

VERMONT: The State of Vermont has been so fortunate as to receive from Senator Redfield Proctor as a gift, a sanatorium which has been erected and endowed at a cost of $200,000. The control of the sanatorium is vested in a board of fifteen trustees, which is a self-perpetuating body.

The Sanatorium is located near Pittsford in the heart of the Green Mountains, in the western part of the state a few miles north of Rutland.

The site consists of about 250 acres; two-thirds of the tract is covered by woods or growing trees and affords a natural park for summer camps.

The main building has a frontage of over 100 feet, the two cottages of about 80 feet each; the three buildings with their connecting corridors make a frontage of 400 feet. The buildings front slightly east of direct south. They are situated

near the front of a high gravelly plateau. The buildings are of brick veneer construction. The interior finish is natural ash, with a few rooms in birch. The floors are of hard wood.

All patients' rooms front either direct south or southwest or southeast, and each two rooms have a private outdoor porch where the patients can sit out in the daytime and, if desired, sleep at night. The doors are so arranged that the patients' beds can be rolled out of the rooms on to these private porches.

The sanatorium is intended for incipient and moderately advanced cases of tuberculosis and has at present a capacity of 32 beds. The price is $7.00 per week. There are no free beds.

Applications should be made to the superintendent.

It is an encouraging sign that besides the above mentioned states which have already established institutions, sanatoria are at this time either in construction, or at least projected, in the following states: Alabama, Connecticut, Indiana, Kentucky, New Hampshire, and West Virginia. Equally encouraging is the number of tuberculosis dispensaries established during the last five years. On April 1, 1909, they numbered in the United States 289.

If any community is in earnest in its anti-

tuberculosis work, it must not limit its labors to the man and woman morally and mentally sound, but must extend them also to those temporarily or seemingly permanently unsound in mind and morals. I refer, of course, to prisoners and the insane.

That consumptive insane patients may be treated successfully for their tuberculous lesions, and the condition of their minds be improved at the same time, has been demonstrated during the last few years in a large number of American insane asylums. It is a hopeful and encouraging sign that more and more attention is being paid to this phase of the tuberculosis problem, for it can not be denied that in former years many an insane person has contracted tuberculosis during his stay in the asylum. Of course, it must not be forgotten that certain types of insanity as, for example, the hypochondriac and others where the physical vitality in itself is lowered, strongly predispose to tuberculosis.

The tuberculosis situation in many of our prisons and reformatories is, perhaps, the most deplorable of all. Three times as many prisoners die of tuberculosis as free men. It has been my privilege to have been commissioned to examine a number of prisons and to have appeared before associations of prison physicians and general prison associa-

tions. As a result of all these studies I plead today, as I often have before, for the examination of every prisoner committed to a penal institution at the time of his entrance, and periodically afterwards; and I plead also for the examination of individuals in detention prisons. As far as I could learn from my visits to detention prisons in many states, prisoners who are simply held for trial or are waiting to be removed to the penitentiary, are never examined by any physician unless they are quite ill and in actual need of medical attendance, or obviously afflicted with tuberculosis. It must be evident that in this way a latent tuberculosis has a good chance to develop for, even in the better city prisons, the usual overcrowding will render the atmosphere vitiated, particularly in winter. If we add to this the lack of exercise and the depressing psychical influence of confinement, nostalgia, and worry, we cannot wonder that prisoners arriving at the penal institution are often found to be tuberculous, some even with very active lesions, while they may have entered the prison of detention seemingly in good health. Again, some may have been a little below par, underfed or weakened by exposure, and as a result have contracted tuberculosis from consumptive fellow prisoners while in jail. I say this with no disregard for the heroic attempts of many wardens

and physicians to render modern detention prisons as sanitary as possible.

In many city prisons the accused sometimes await trial for six months or longer. They are not occupied with anything, and are allowed to exercise in the open air only once a week and for about an hour and a half. It is well known that many detention prisons are not at all hygienically built, and that there exist additional depressing factors in many of them well calculated to further tuberculous diseases.

What can be done to strike at the root of this deficiency in dealing with the tuberculosis problem in prisons? A competent staff of expert diagnosticians should be attached to every detention prison to examine each prisoner for tuberculosis, syphilis, or other infectious diseases. The seeming increase of expense which would arise from this, will in the end result in a financial and sanitary benefit to the community at large. I can also see no reason why the prisoner who has means should not be taxed to defray the expense for a measure through which he himself derives the greatest benefit. If he is himself unknowingly afflicted with tuberculosis, the early recognition may mean to him the saving of his life. If the disease is recognized in one of his fellow prisoners, he is protected from contracting it.

If prisoners would only have to remain in detention prisons a short time, the enforced idleness with one hour and a half open-air exercise weekly might not be very injurious; but when their time of detention is longer than three or four weeks, a physical, mental, or moral deterioration is almost inevitable. No prisoner should be detained for trial longer than four weeks, unless it be in the interest of justice. It is at the very beginning of incarceration and enforced idleness that these factors produce the most depressing effects, and if there is any predisposition to tuberculosis, it is sure to develop then. Whenever practicable, even detention prisoners should be occupied with something useful and health-sustaining. By this I do not mean forced labor. Lastly, there should be some arrangement in the detention prison to give the prisoner a sufficient amount of exercise in the open prison court to assure his physical well-being; not weekly, but daily.

It would thus seem that the first step toward the prevention of tuberculosis in penal institutions should be a most careful examination of each individual, and the weeding out and isolating of all tuberculous prisoners detained in jails. The tuberculous patient should remain isolated in the detention prison as well as in the penal institution,

and he should be given the benefit of hygienic and dietetic treatment from the first moment he becomes a ward of the state or city.

When the time for his transfer comes, the history card of his disease and the recommendation of the physician should be transmitted with the other papers of the prisoner to the penal institution. After his arrival at the prison in which he is to stay for some length of time, the physician will decide whether he is able to work or not, and what kind of work might be most conducive to his recovery. There is no gainsaying that the ideal occupation for the tuberculous prisoner is agriculture or garden work.

I have stated before that not only should there be a careful examination of every prisoner for tuberculosis when he enters the prison of detention or the penal institution, but his chest should be reëxamined periodically at least once every three months. With this periodical examination a very incipient case, which might have escaped detection during the "entrance" examination, is sure to be discovered before the disease has progressed to any considerable extent.

Expectorating, except in proper receptacles placed for that purpose in cells, workshops, chapels, schools and on the grounds, should be punished by severe disciplinary measures. That

there may never be an excuse for violating this rule, I would go further. I would not only provide a sufficient number of fixed, elevated, suspended (Fig. 55), simple, or self-flushing cuspidors, such as or similar to the ones illustrated (Figs. 40, 41), but I would see that each prisoner has some sort of pocket flask, or receptacle made of metal, glass, or pasteboard. (See Figs. 7, 9, 11.)

FIG. 55. Proedohl's Iron Spittoon for Use in Workshops.

A prison is, perhaps, the only place in the world where spitting regulations can be rigorously enforced, and it is but fair that, if we say to an individual "don't spit here" and "don't spit there," we should give him a chance to spit somewhere when he has an excess of saliva, a cold, etc. I am firmly convinced that with such a measure not only would tuberculosis diminish in prisons but epidemics of pneumonia or grippe would be less to be feared and more easily controlled. I should even like to recommend as a regulation that every prisoner must hold his hand before his mouth when coughing, whether this coughing spell is followed by expectoration or not. Thus, tuberculous droplet infection will be avoided, and since

the coccus of pneumonia is so very prevalent even in the mouths of healthy individuals, this precaution may perhaps also tend to the diminution of pneumonia. As an additional measure to prevent droplet infection, it might be well never to put prisoners too close together at the work tables. It goes without saying that the personal and bed linen of the tuberculous prisoner, as well as his clothing, should be regularly subjected to disinfection. The handkerchiefs of this class of prisoners should consist of squares of cheap muslin, which should be burned after use.

To judge from the appearance of the various kinds of blankets, comforters, and quilts which were lying on the cots of the prisoners' cells in some of the penitentiaries I have visited, it seemed to me that these coverings might become a means of spreading infection, not only in tuberculosis but in a good many other communicable and contagious diseases. The blanket and comforter are, as a rule, the private property of the prison inmate. He brings these articles with him, or they are given to him by visiting friends or by fellow prisoners who have been discharged. In most prisons these coverings, as well as the clothing which the prisoner wears on entering the penal institution, are carefully disinfected. This precaution does not, however, suffice to prevent the

bed covering from becoming thoroughly infected afterwards, particularly with the germs of tuberculosis. Pulmonary tuberculosis is so insidious in the early stages that the prisoner may have infected his bed clothing long before his disease has been discovered by the prison physician, unless, of course, frequent and thorough examinations of all prisoners are in vogue. To guard against infection which may arise from blankets, comforters, etc., having been soiled by infectious sputum or other infectious material, I would suggest that after thoroughly disinfecting these articles when they are brought to the prison, they be incased in a covering of light-colored washable material (not necessarily white), as one uses a pillow-case. By basting the blanket in its "blanket-case" it can be manipulated with as much ease as if uncovered. With comforters and quilts the same method should be pursued. There should be two sets of cases so that the blankets need not remain uncovered while one is being washed; thus the blankets need never come in direct contact with the prisoner's body. I am convinced that with such a system and with the injunction that the washing must be done regularly, one factor of transmitting tuberculosis and other infections from prisoner to prisoner will be done away with.

Even the prisoner who is only suspected of

having tuberculosis should have a separate cell and, in any case, the placing of two prisoners in one cell should be avoided as much as possible. The bucket system for receiving the ejecta of prisoners during the night and during the day when confined to their cells, is most deplorable. It is unsanitary in general, and as far as it permits the emanation of odors and gases, it is deleterious to the health of the inmate. The individual cell water-closet, with a perfect trap and cover, such as is used for example in our New York Tombs and other new prisons, is certainly to be recommended in place of the bucket system.

The more advanced cases of tuberculosis, particularly those with constant fever and in whom there is disintegration and corresponding abundant expectoration of bacilli, should be treated in special wards; and in summer, perhaps, in special tents of the prison hospital.

In view of the probable indifference to hygienic regulations of the inmates of the hospital, I would insist, for the purpose of preventing droplet infection, that all patients in the more advanced stages must wear a mouth mask. Patients in a number of European hospitals for consumptives are told to make use of mouth masks in order to protect themselves as well as the other patients. Figure 56 shows such a device. It is known as Professor

Fränkel's mouth mask. I really think it a valuable means to prevent droplet infection which, with the advanced cases among consumptives, is quite a serious factor in the propagation of the disease. By impregnating the gauze which is held in place by the metallic frame of the mask with some medicinal substance, the inhalation of which allays the cough and is soothing to the inflamed pulmonary surface as, for example, 10 or 15 drops of a mixture composed of equal parts of menthol, eucalyptus oil or creosote, and spirits of chloroform, the prisoner wearing the mouth mask is likely to be benefited and the protection of others is assured.

FIG. 56. Fränkel's Mouth Mask.

The custom of whitewashing a room in which ordinary and healthy individuals stay but a short time might be considered a hygienic procedure. When, however, this process has been adopted for the sake of doing away with the danger of tuberculosis, I doubt its efficacy. If a cell has been previously occupied by a tuberculous prisoner, he will surely have infected its walls; if not

directly by expectorating on them, he will have done so by droplet infection. Whitewashing is well-nigh useless in such a case, since dried whitewash is apt to scale off, especially when there are several coats, and it will produce a certain amount of dust in a small room like a cell. This dust is irritating to a sensitive lung, and it is not unlikely that it may be an aggravating factor with prisoners who enter the penal institution only slightly tuberculous, or predisposed. The new occupant, if at all debilitated, physically or mentally depressed, is much exposed to the contraction of tuberculosis in such an environment. The new coat of whitewash is apt to scale off with the underlying infected layer, and turning into dust makes an infection by inhalation *par excellence.*

That tuberculous germs may be inhaled from infected walls has been demonstrated again and again, not only inside of prisons, but in the tenement houses of the poor and even in the apartments of the rich. My friend Dr. Ransom of the Dannemora prison, with whom I had many conversations on the subject, expresses himself as follows: "Observation and experiment show that whitewash really promotes the spread of tuberculous disease. The fine scales and floating particles that emanate from the dried whitewash, when disturbed, not only irritate the bronchial mucous

membranes, but they are also carriers of infection to the point irritated."

To remedy the danger arising from whitewashing small cells, I would suggest that the whitewash be replaced by oil paint which can be washed with disinfecting fluids. The cells should, of course, never be smaller than five hundred to six hundred cubic feet, well ventilated and well lighted by natural light in daytime, and by electric light at night (gas illumination absorbing too much oxygen).

As to the general sanitation of prisons as far as it is related to tuberculosis, I only wish to say that a prison with all its annexes should be constructed so that there is plenty of light and ventilation, and on a soil that is dry and porous.

To avoid acquiring a predisposition or developing an incipient case, I would suggest the following: All prisoners should be given a chance to exercise several times during the day in the open air, even if only for a short time, and during that time they must not only be permitted, but should be enjoined to take deep inhalations, or better yet, regular respiratory exercises. The exercise in the open air should, however, not be limited to weekdays. According to the prison regulations now in vogue in most penal institutions, prisoners are confined to their cells not only from the hour of

five in the afternoon to six in the morning, but also during almost the entire twenty-four hours of Sundays and holidays, and when a holiday follows a Sunday, or vice versa, the prisoners are necessarily locked up in their cells for two successive days. That such close long confinement in a small, ill-ventilated cell must be harmful is self-evident.

In well-conducted prisons the inmates are required to bathe regularly, and their skin is usually in good condition. To the prisoner predisposed to tuberculosis or one whose case is so incipient that constant medical supervision is not necessary, permission for daily cold douches should be given. To this class of prisoners, predisposed or incipient, it seems to me also that it would pay the state to give food containing a little more of the nitrogenous substances and the carbohydrates than the regular prison fare now supplies.

One predisposing factor to tuberculosis in prisons, which seems to have been overlooked in most of the reports on the subject, is overworking the prisoners. While it is true that in the majority of prisons the hours of work are rarely more than those of the average free laborers, we must not forget that the free man, laboring eight or ten hours a day, has a relatively better quality of food, the exhilarating influence of freedom of action, and naturally superior hygiene.

I do not wish to make this statement in the spirit of criticism, but simply to point out the general likelihood of a predisposed individual developing tuberculosis more rapidly under conditions of confinement than when in normal environments.

It is not necessary to speak of any particular prison here, but in many of them the workshops are very badly ventilated, overcrowded with workers, often overheated, and where there should be dust collectors these are wanting. Tobacco workers, for example, are prone to tuberculosis under the best conditions. How much more must they be in danger in a prison workshop full of dust, where there is hardly elbow room and where the air is greatly vitiated! Since it is a very common practice for cigarmakers to paste the final leaf with saliva, it must be evident that no prisoner, even slightly afflicted with tuberculosis, should be permitted to make cigars, leaving aside the fact that such conditions are sure to aggravate his disease.

I can not leave the subject of tuberculosis in prisons without referring to one phase of it which appertains rather to the welfare of the community at large. I refer to the pardoning of prisoners far advanced in tuberculosis. Whether the practice of restoring the pardoned prisoners to their often poor families is always a wise one, I venture to question seriously. It is sad enough that prisoners

who have contracted tuberculosis in prison, or whose tuberculosis has been aggravated through prison life, should be discharged upon the community at the expiration of their sentence without any regard to where they will go or what they will do. They will invariably constitute a source of infection unless they have been prophylactically trained and are willing to continue to be careful. Prisoners virtually dying from tuberculosis should not be pardoned and sent home, unless the authorities are sure that the unfortunate sufferer will be able to find support and not become a source of infection.

The treatment of advanced cases has already been referred to, but in this connection I wish to say a word about the admirable work done at the Texas tuberculosis agricultural prison colony, known as the Wynne State Farm, under the scientific and humane management of Dr. Fowler. The statistics of four years' working of this farm are as follows:

Total number discharged	34
" " pardoned	30
" " transferred	37
" " died	46
" " on hand	33
Total number treated	180

At the conclusion of Dr. Fowler's interesting report he comments on the statistics as follows: "I will say that the thirty-seven men transferred are virtually cured, at least one-half of those pardoned and discharged were in good physical condition, and the majority on hand are improving. The labor of the one hundred and eighty men was practically of no value anywhere else in the prison as most of them had reached an advanced stage of tuberculosis before their reception at the Wynne Farm. The farm is more than self-sustaining, if the expense of guarding the prisoners is deducted. The men all occupy the same building, as they have to be guarded day and night."

From the report it is evident that tuberculosis has been on the decrease in that prison, and there is no doubt in my mind that the tuberculous prisoner, cured by a healthful and invigorating agricultural pursuit, will be returned to society after the expiration of his sentence many times a better member of it than he was formerly.

A most important feature in the prevention of tuberculosis, or more exactly, in the prevention of a predisposition to tuberculosis, is the restriction of child and woman labor. It is impossible to resist the invasion of the bacilli when the individual is in a state of physiological poverty.

This condition is sometimes called being "below par." A woman, who in perfect health and under normal conditions may do her physical and mental labors as well as anybody else, should not, in a civilized and enlightened country, be allowed to work in either factory, workshop, sweatshop, or at home until virtually the last day before her delivery; nor should she be allowed to resume her labors until a month or two after confinement. That horrible condition known as child labor, still in existence in some of our states, should forever be done away with, and laws should be enacted and enforced that will make it impossible for a child to be forced to spend hours and hours, sometimes ten, twelve, or fourteen a day, in a factory or workshop, often under the most unhygienic conditions.

The growing organism of a child is in need of all the fresh air and outdoor exercise it can possibly get, and to confine it indoors during the years of its physical development, often in an overheated, dusty, and smoky atmosphere, and to overtax its muscular and nervous system by long hours of work, is the very thing which causes the physiological poverty above referred to. If a child has contracted tuberculosis during infancy, and because of a certain amount of outdoor play and good care during early childhood the tuber-

culosis has become latent, though not entirely cured, it is almost certain to develop and become active if he is put to work between the ages of ten and fourteen. The child's body is arrested in its development and his chest capacity becomes much below normal. Lack of sleep and recreation cause him to become an easy prey to the tubercle bacilli under these conditions, even if his system has not been invaded by them in infancy. No child between the ages of eight and fourteen should be allowed to do more than his school work. The home, the school, and the playground should be his only abodes.

By reason of their environment, and unfortunately also often by reason of example in home or workshop, children that are compelled to work become very readily addicted to the use of alcohol. Their humdrum existence often makes them indifferent to any moral issue; their weakened nervous system can not resist temptation and often craves for stimulation and excitement. Alcohol predisposes to tuberculosis in the child as well as in the adult, and the prevention of child labor will in many instances prevent both alcoholism and tuberculosis.

Sweatshops, that is to say the manufacture of any article in the crowded homes of the poor, should be absolutely prohibited everywhere. In

my work in the tenement homes I have again and again seen overcrowded rooms used as workrooms during the day and as bedrooms at night, and among the workers I often found more than one tuberculous individual in the most active stage of the disease. When we recall the numerous sources of infection from close contact, do we need to wonder that tuberculosis is most frequent among the toilers in the tenements and particularly among those who work at home?

The sanitary supervision of all factories with reference to proper ventilation, dust catchers, prevention of overcrowding, proper washroom and toilet facilities, must form an important part of the legislation of any state desiring to protect its laborers against contracting tuberculosis. The hours of work should be regulated by law, so that overwork and overstrain may be avoided, and thus a predisposing factor to tuberculosis removed. It might even be wise to issue anti-spitting regulations for factories, to compel the employers to provide a sufficient number of well-kept cuspidors, and to make promiscuous expectorating on floor and walls punishable by discharge. The automatic flushing spittoons already shown in Figs. 41 and 42 and the Proedohl's spittoon of iron (Fig. 55) seem to be particularly well adapted for sputum receptacles in factories, workshops, etc.

Industries which are particularly dangerous regarding tuberculosis, should be made the subject of special study on the part of the legislators in order to minimize, as far as possible, the danger to the workmen and the hardship to the manufacturer.

In Chapters II and VI we have spoken of the prevention of tuberculosis through the milk and meat supply. It is necessary here to say a few words on the duties of state legislation regarding bovine tuberculosis. Every state should have bovine laws so framed that by their enforcement no injustice can be done to farmer, consumer, or resident in a neighboring state. When, with the aid of tuberculin or other tests, cattle are found tuberculous to a degree that their destruction becomes necessary, it should be the duty of the state to compensate the farmer for his loss. No tuberculous meat should be allowed to reach the market. There should be reciprocity between neighboring states; for if one state has good bovine laws, destroys the cattle and compensates the owner, and the other state has no bovine laws at all, this will at times tempt unscrupulous individuals, under the shadow of the night, to drive their tuberculous cattle into the neighboring state with good bovine laws where they will be paid for. When all states will have these

laws, such unscrupulous conduct will not be possible.

Our federal government has also its part to play in the combat of tuberculosis. The one class of men in the United States government employ among whom tuberculosis is relatively rare, is the army and, perhaps, also the navy. This is due, on the one hand, to the fact that men of weak constitution are not accepted for military service, and on the other, to the thorough training of our military and naval physicians, who examine every candidate for the army and navy most carefully for the possible existence of tuberculosis, and thus avoid sources of infection in the military or naval service. When a soldier or sailor does develop tuberculosis during his service, his condition, as a rule, is readily discovered; he is isolated and treated and usually transferred to one of the existing federal sanatoria, situated at Fort Stanton, New Mexico, for the Marine Hospital Service; at Fort Bayard, New Mexico; and at New Fort Lyon, Colorado, for the army.

It would, nevertheless, be an admirable thing and helpful in the prevention of tuberculosis, to instruct every United States soldier and sailor in the simple principles of the prevention of tuberculosis. This would not only be helpful to the men themselves, but would make them educational fac-

tors in hygiene when they returned to civil life or entered other spheres of federal activity.

There is also an army of men in the government non-military services whose mortality from tuberculosis could be vastly decreased. I refer particularly to the thousands of post-office employees. The Postmaster-General's order, No. 855; in the Daily Bulletin, No. 7,966 of April 8, 1906, contains the following:

REGULATIONS TO PREVENT THE SPREAD OF TUBERCULOSIS IN GOVERNMENT BUILDINGS, OFFICES, AND WORKSHOPS.

1. All persons in Government employ are positively forbidden to spit upon the floors.
2. Rooms, hallways, corridors, and lavatories shall be freely aired and effectually cleaned at least once a day, and not during working hours.
3. Spittoons shall receive a daily cleansing with very hot water and when placed ready for use must contain a small quantity of water.
4. Dust must be removed as completely as possible by means of dampened cloths or mops. It should never be needlessly stirred up by a broom or duster, as this practice only spreads the dust and germs.
5. Floors of tiling, brick, or stone must be frequently scoured with soap and water.
6. The senior clerks in charge of workrooms will take

measures to secure, during working hours, the admission of as much fresh air and sunshine as the conditions will permit.

7. The use of individual drinking glasses is recommended.
8. Persons in Government employ who suffer from pulmonary tuberculosis shall, when possible, be separated from others while at work.
9. Such persons will not be permitted to use the public spittoons, but must provide themselves with individual sputum receivers, preferably of easily destructible material, and carry these with them on arrival and departure. They will be held strictly responsible for the disposal and destruction of their own sputum, so that no other person's health may be endangered therefrom.
10. Such persons must provide their own drinking glasses, soap, and towels, and shall not use those provided for the general use.
11. Plainly printed notices, reading as follows: "DO NOT SPIT ON THE FLOOR; TO DO SO MAY SPREAD DISEASE," shall be prominently posted in rooms, hallways, corridors, and lavatories of public buildings.

These regulations as a whole are excellent, but from conversations I have had with a number of post-office employees and even postmasters, it seems that there are unfortunately not enough helpers, such as charwomen, janitors, and cleaners,

to carry out these admirable instructions. The floors are not scrubbed and cleaned nearly often enough when one considers how many men work in these rooms. There should be more workrooms in all of our post-offices so that one section can always be cleaned without interference with the work, and in this cleaning and scrubbing the pigeonholes, which are natural dust-collectors, should not be forgotten. The cleaning should naturally be done when the smallest number of employees are in the office, and preferably always by the pneumatic cleaning process. The corridors, lobbies, and other portions of the average post-office building to which the public has access, are usually kept in pretty fair condition; but it is not always so with the rooms in which the men work behind the screens.

There is no government service which touches the people so directly or to so great an extent as does the postal service, and this induces me to speak of another source of infection to which too little attention has been paid heretofore. There is scarcely a citizen of this country who does not sooner or later receive matter through the medium of the mails. This mail is conveyed from one place to another in receptacles made of canvas; these receptacles are used until they become unpatchable, but are never cleaned. As these sacks

become torn, they are sent to the mail-bag repair shop and are patched. When in use they are more or less heavy and are thrown from the cars or dragged by the cords over the railroad platforms and approaches, and also through the office. If a consumptive is on the platform waiting for his train and has expectorated before the messenger comes along dragging the mail over the platform in the canvas sack to the car, this sputum is wiped up by the canvas sack and dries, and the next time the sack is thrown out or handled in the post-office, the air is impregnated with bacilli-laden dust. The man handling the sack, sooner or later has his hand to his mustache or mouth, in addition to being exposed to inhaling the infectious dust.

It has been said that the mail is on the inside and the infection on the outside of the bag, but this is begging the question. Eventually, all of these sacks are rounded up in some depository for shipment, and the result is that some nineteen sacks are folded and placed inside the twentieth sack as a receptacle. This is the manner in which they are stored and shipped. If a sack full of these empties is shipped from Chicago to New York, the outsides of the nineteen bags are rubbing against the inside of the twentieth bag all the way to New York, and the filth and dirt is left inside

this twentieth bag, in which mail is deposited at New York for delivery at some other office, and this mail rubs up against the inside of the sack and then proceeds to a thousand homes or commercial offices.

It would seem entirely practical to clean these mail receptacles or sacks. It could be done with very little expense in the following manner, which, briefly stated, is to establish at, at least three points, one central and one on each coast, depositories for mail sacks to which they could be sent to be disinfected and cleaned. There should be a sufficient supply of equipment so that, for instance, all sacks coming into New York, Chicago, San Francisco, or other selected points, could be sent to some place for treatment before being used again; and all of those which, upon inspection, showed the need of cleaning could be sent direct to the nearest depository. A one-story structure built along a railroad, where shipping facilities could be provided and preferably where water-power could be obtained, would be required. This building would have at one end a receiving room, in which the office for the necessary records would be situated, and the sacks would be separated according to size and character and transfered to the next room, where there should be cylindrical washing machines revolving in a pit,

in which the water could be boiled by steam pipes and into which and from which it could pass by means of large cocks. Disinfectants should be used in this water, and after the bags had been boiled, disinfected, and washed, they could be removed to the opposite side of this room, adjoining which would be a dry room; this dry room would have a travelling link belt with hooks upon it, which would pass through drums to change its direction, so that the bags would go in through trapdoors at one side of the room, pass back and forth and out at the further corner. Here they could be removed automatically from the hooks, dropped into a slide, and run through a mangle simply to smooth them out. From this they could be reassembled and stored in a shipping room at the farther end, from which they could be sent out again for general use.

I am indebted to a friend, who has had a large experience both in post-office work and in public sanitation, for a little sketch which I take pleasure in reproducing here, showing how the cleaning and disinfection of empty mail bags can be done easily and cheaply. (Fig. 57.)

This is, of course, only intended as the rough suggestion of a general plan, and the details would have to be worked out.

I wish to say one more word about preventing

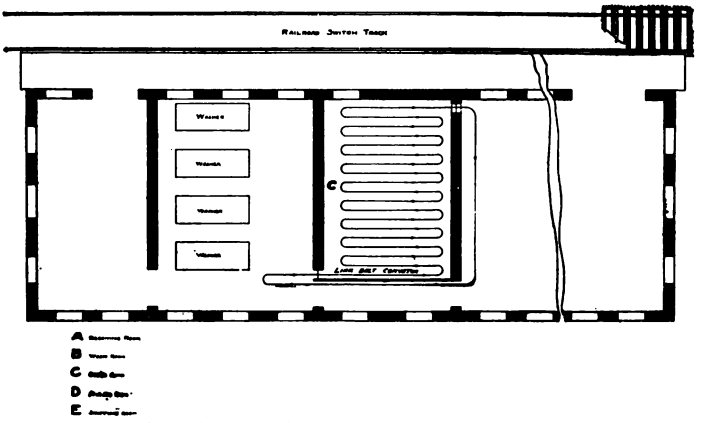

FIG. 57. Plan of Station for Cleaning and Disinfecting Post-office Mail Bags.

the development of tuberculosis among our post-office employees and other men in federal civil service. First of all, a very strict and careful physical examination by a competent physician should be made of every one who is now an employee in these services. Secondly, every applicant to one of these services should be examined, and only if found free from tuberculosis should he be admitted to the service. To each large post-office should be attached a physician to whom employees might apply for reëxamination at stated intervals. Should any one be discovered to be tuberculous, he should be at once excluded from indoor service and be placed under proper treatment. One of the physician's duties should also be to watch over

the sanitation of the post-office buildings and workrooms.

To make the treatment of the government's tuberculous employees possible, it would be a most excellent thing for the United States government to have not only a sanatorium for its consumptive soldiers and sailors, but also one for its faithful servants who contract tuberculosis in the non-military service of the government.

To municipal authorities, state, and federal authorities alike, we would finally recommend the establishment of horticultural and agricultural colonies and similar kinds of outdoor labor centers where the relatively cured consumptive could have a chance, by healthful labor and careful living, to complete his cure or make it more lasting. There is to my mind no greater fallacy and no greater waste of money than for the state or municipality to cure the tuberculous poor who come from the most unhygienic surroundings and most unhealthful occupations, and then to return them again to the same unhygienic environments or to the same unhealthful occupation from which they came. In my humble opinion, it would even pay to have a municipal or state labor bureau, by the aid of which suitable occupations could be found for individuals leaving the sanatorium.

I must not forget in this chapter to mention one

more matter which is most important in the crusade against tuberculosis. Our statesmen should do all in their power to stem the ever rising tide of emigration from village to city. We should strive to reverse this tendency. The interests of the farmer should be considered so that farming will have more attraction to the rising generation than it has had in the last few decades. If philanthropists can be interested in this work, all the better; but the state should be rich enough in itself to endow institutions for instruction in scientific and profitable agriculture, and also to provide healthful amusements, good libraries, and other educational institutions in country districts, thus making living outside of large cities more interesting and attractive to young people; in short, the love of nature and life in the open air should be more cultivated. In the proportion in which this is done, tuberculosis will decrease.

The creation of schools of forestry in connection with the preservation and cultivation of forests in many states where a wasteful destruction of trees is now carried on, would give useful and healthful employment to numbers of people, as well as render the region more healthful. It would offer attractive careers to young men seeking to overcome hereditary or acquired tendencies to tuberculous diseases.

To combat tuberculosis successfully in a country like our own, there must be coöperation of municipal, state, and federal governments. Such coöperation exists in most European countries where there is either a Department of Public Health with a minister at its head or a bureau equivalent in rank, as for example "das Reichsgesundheitsamt" in Germany and the "Conseil Supérieur de Santé Publique" of France. It is most gratifying to learn that the Hon. Wm. H. Taft, President of the United States, has recently pronounced himself distinctly in favor of such a department or federal bureau of health. Shortly after his inauguration last March, one of his first actions was to approach the Surgeon-General of the Public Health and Marine Hospital Service as to the advisability of establishing, in line with practical government methods, a new Public Health Bureau, as suggested to him by the Committee of One Hundred, the American Health League, and the American Medical Association. Thus, it seems that President Taft has realized that to combat tuberculosis successfully requires not only well-trained physicians and an intelligent people, but also a wise government taking an active part in the work.

CHAPTER VIII

WHAT EMPLOYERS OF EVERY KIND CAN DO TO DIMINISH TUBERCULOSIS AMONG THE MEN AND WOMEN WORKING FOR THEM

Factory hygiene and sanitation should not be merely a matter attended to because of the laws enacted and enforced by the state or city. Factory inspectors, employers of large forces of men and women, factory owners and managers, storekeepers, and all others having men and women in their employ, should realize that the better the hygienic conditions are which environ their employees, the better the work will be done and the fewer will be the absences on account of illness. The employer who has the welfare of his employees at heart can do an infinite amount of good in the prevention of disease, and particularly of tuberculosis. To this end, he should begin by seeing that the lighting, heating, and ventilation are as perfect as they can possibly be in factory, workshop, office, store, or kitchen, and the amount of dust and odors in all such places should be reduced as much as possible. Spitting regulations should be enforced

and suitable well-kept cuspidors placed throughout the buildings.

In the preceding chapters I have spoken of factory hygiene, but we must not forget that besides the factory workers there are thousands of employees and clerks in offices and stores, who are often exposed to the inhalations of vitiated air and dust not infrequently mingled with disease-producing organisms, among which those of tuberculosis are almost sure to be found.

Often in the offices of the wealthiest corporations, bankers, and great commercial concerns, the air is about as foul and vitiated as it can well be. These conditions are, no doubt, permitted to exist through ignorance of the importance of fresh air. It is interesting to observe that the heads of the offices expose themselves to the same unhygienic environments as their employees. They seem to forget that a glass wall, a few feet in height, does not prevent them from breathing the air exhaled and used up by their employees. If the artificial ventilation is not sufficiently perfect to assure fresh, good air all the time in these offices, the only remedy is to open the windows frequently to change the air, and this change of air should be made even when the weather is cold. Wherever possible, the lighting of any office or factory, workshop, store, or even kitchen should be by

electricity. Gas consumes the oxygen needed for the human beings, and unless there is a constant supply of fresh air in any room lighted by gas and filled with human beings, the atmosphere is bound to be deficient in oxygen and with carbonic acid gas in excess. Toilet and washing facilities should be perfect everywhere, but particularly so where a great many people are employed.

There are industries in which, during the hours of work, laborers are often exposed to a high temperature. In some occupations the laborers work half stripped, as otherwise they could not stand the heat. In such cases especial facilities should be provided for the laborers to cool off gradually in order to avoid the often serious consequences of going from an overheated room half nude into a cold apartment to dress. In industries connected with a great deal of dust, special dust-collectors should be installed and, if necessary, laborers should be provided with respiratory masks.

These precautions will do much for the prevention of the predisposing factors to tuberculosis, for as it has been said before, fresh, pure air and cleanliness are powerful agents in protecting an individual from the attacks of disease.

We have already spoken of the anti-spitting regulations and the needs of their enforcement in order to diminish the direct sources of infection

which heretofore have caused so many employees in factories, workshops, stores, and offices to become victims of consumption from the dissemination of bacilli through indiscriminate expectorating. To such ordinances there should be added a rule something like this: It is just as important to hold a hand or handkerchief before the mouth when coughing as it is to expectorate into a proper receptacle. This can not be mentioned too often, for the possibility of droplet infection has been much overlooked, and because of its insidiousness it is all the more dangerous when men work close together indoors.

Another important step to prevent direct infection from tuberculosis, here as elsewhere, is the careful examination of every employee entering a workshop, factory, store, office, etc.. By this method a patient afflicted with an. open tuberculosis, that is to say, with the disease in a stage in which he needs treatment and care and in which, unless he receives treatment and care he may constitute a source of infection to others, may be excluded. This exclusion is, of course, particularly necessary when the work which is expected of the patient is arduous and when he is placed in close contact with other workmen.

To prevent tuberculosis in these places where many people work, it does not suffice merely to

examine the patient on entering the employment; it will also be necessary to reëxamine all employees at least once, but, better yet, twice a year in order to ascertain whether tuberculosis may not have developed since their entrance. Besides this, the employees should know that they have the privilege to call at any time on the factory physician for examination, if a suspicious symptom should show itself.

It will be in the interest of the employer to engage a physician to enlighten the employees by an occasional lecture on the subject of tuberculosis; to teach them what they should know about it and how they can help to diminish the spread of the disease. But the responsibility of the employer regarding tuberculosis does not end here. It will be necessary also for him to see that, when one of his employees is found to be tuberculous, he receives immediate care and treatment at home or in a special institution. The benevolent employer who has the welfare of his employees at heart, will not even content himself with that, but will also see that his employee's family, now deprived of its breadwinner, will not be in want. Whether the employee, if found tuberculous, can be treated at home or must be sent to a special institution, will depend on circumstances. In some instances it may be advisable for the patient, when

cured, not to return to the same occupation, but to seek outdoor employment or lighter labor.

Proper sanitation and proper safety devices in the mines and collieries where so many people are engaged will prevent tuberculosis and other diseases. The inhalation of coal dust in mines can be minimized by proper ventilation, and by judicious division of labor the health of the miners can be improved, if the owner will only do his duty in this respect.

I have often wondered why it is that we have in our large cities so many tuberculous servants. Many of these were born in foreign countries and nearly all, even those born in this country, had never been ill before they came to the city; but while serving as domestics they contracted tuberculosis. The reason for the frequency of tuberculosis among servants in the city must be primarily ascribed to the very often unhygienic methods of housing them. The majority of them come from rural districts and have been accustomed to fresh air and outdoor life. In the city they are often cooped up in the smallest room of the flat which itself receives neither too much sunshine or air. In winter the room is often overheated, or else it is without heat at all.

It would seem as if it were in the power of every one employing servants to see that the con-

ditions productive of tuberculosis are done away with.

Telephone operators, who are principally women, belong to a class of employees whose occupation demands confinement indoors, and close confinement, as has been pointed out, not infrequently predisposes to tuberculosis. The remedy for this lies, of course, in ventilation and care from infection. The air in the operating room should be kept cool and fresh even in winter. The girls should be warmly clad and should work in a good deal lower temperature than is usually to be found in these rooms. Work should be divided so that the physical strain is not too great. All operators, male or female, should be examined for tuberculosis and periodically reëxamined. The transmitter should be washed out with some antiseptic solution every time a man or woman goes on duty, thus there will be an assurance that whatever germs may have been expelled, be they grippe or tubercle bacilli, pneumonia cocci or other disease-producing microörganisms, will not gain entrance into their systems. But the telephone company also owes to its patrons the duty of protecting them against possible infection from the use of the public telephone. A simple device, as illustrated in the accompanying picture (Fig. 58), would suffice for all practical purposes to protect from possible

infection. A roll of thin paper is attached to the telephone as a protective screen, so that the end passes over the transmitter. After or before each time the telephone is used, the paper is pulled down so that a fresh portion covers the mouthpiece, and the end torn off. The torn-off pieces should be collected in a special receiver and burned at night. The thin piece of paper does not interfere with the transmission of the voice. Similar arrangements are already in use in some of the Western health resorts.

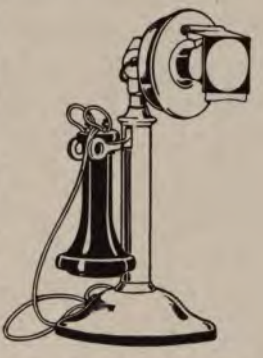

FIG. 58. Hygienic Device for Telephone Transmitter.

There are, perhaps, no employers or corporations which are responsible for the safety and health of so many people as the railroad companies. What has been said in the preceding paragraphs on the duty of employers and employees, on the sanitation of workshops, on the examination and reëxamination of employees for tuberculosis, and on taking care of those who may have developed or contracted the disease while in their employ, certainly applies most strongly to railroad corporations. But also, because of the difficulty of the service, managers of railroads should bear in

mind that physical overwork and overstrain not only lead often to serious railroad accidents, but that individual employees exposed to constant overwork or overstrain more readily contract tuberculosis than other individuals.

Besides the duty of an employer toward his employees regarding their health, a railroad company has an equally great responsibility not only regarding the safety, but also the health of its patrons. Much has been done for the sanitation of our railroad coaches and sleeping cars, but much more needs to be done. The ventilation in all these conveyances can still be improved; and it is an unfortunate fact that in the smoking compartments, except of the first class, there are no spittoons. Usually in the smoking cars or compartments of the second class, people spit where they please. Some companies have placed anti-spitting signs in the ordinary day coaches, but they have failed to supply cuspidors for those who will spit.

A thorough cleaning and airing of all the coaches after each trip, and on long trips at least every six hours, would certainly render these coaches more sanitary. What has been said of the day coaches applies also to the parlor cars, and particularly to the Pullman cars which are often used by consumptive travellers. The spittoons which one finds in the Pullman cars, while almost

always neat and clean on the outside, never contain any water, and the sputum has an excellent chance to dry in the flat cuspidors. The danger from dried sputum has been dwelt upon enough in the preceding pages to need no further mention.

Consumptive travellers going from one place to another in search of health are quite careful as a rule; still, I wonder if it would not be a good practice to oblige every Pullman car conductor or porter to report to the proper authorities when they have had a consumptive among their passengers, so that the car may be disinfected with formaldehyde gas before it is used again. On certain roads where it is well known that consumptives travel a great deal, every car should be disinfected on the arrival at its final destination. I have often thought it would be a good thing and would pay such companies to have special ambulance cars for the transportation of consumptives to and from health resorts.

I must not leave the subject of railroad hygiene without speaking of one of the most annoying and unsanitary practices. I refer to the Pullman porters' habit of dusting the garments of passengers leaving the car, in the faces of those remaining. The windows are, of course, closed. This practice, besides being a nuisance, must be considered unsanitary and dangerous. There can be no ob-

jection to the porter brushing a passenger in the vestibule, but I repeat most emphatically that brushing the garments which the traveller wears—his overcoat, hat, and even his valise—in the midst of a car crowded with passengers and with the windows closed, I consider to be a practice which tends to propagate diseases of the respiratory organs.

The railroad companies should pay careful attention, as has been often mentioned, to providing properly ventilated office rooms for their employees; and telephone and telegraph companies should not forget that the same duty devolves upon them. The best possible ventilation and the best possible method of lighting and heating these offices will assure less indisposition, better work, and fewer cases of tuberculosis, which are altogether too frequent among telephone and telegraph operators.

The farmer has an opportunity for preventing tuberculosis in more than one direction. He can prevent a predisposition by having his own home and the sleeping and living apartments of his help properly ventilated. It is astonishing how little people living in the country, and particularly farmers, make use in their houses of the good, pure air which is at their very door. For a farmer to overwork a farm hand and not provide him with sufficiently good food and also, which happens

not infrequently, to deprive his own family of the best products of his farm, is as foolish and as uneconomic in the end as anything can be.

To help in the direct prevention of tuberculosis, the farmer can familiarize himself with the few necessary facts regarding the modes of infection in man on the one hand, and on the other, can study and practice carefully what is necessary for the prevention of tuberculosis among cattle.

While it is beyond the scope of this book to speak in detail of the prevention of tuberculosis in cattle and other domestic animals, I will, at least, point out the essentials with which the farmer should be familiar regarding the subject. In animals as well as in man, the direct cause of this disease is the tubercle bacillus. Bovine tuberculosis is prevalent in nearly every country. The symptoms of the disease are much like those in man. They begin with relatively slight functional disturbances. The way the germ of tuberculosis is transmitted from animals to men has already been explained. A tuberculous farm hand or anybody else expectorating on the meadows over which cattle graze, a tuberculous individual expectorating in the stable where cattle are housed, may give the disease to the animals. The point has been disputed, but it is now generally conceded and has been shown experimentally that the trans-

mission of tuberculosis from animals to men and men to animals can take place. Although the bacillus is not identically the same, the one of the bovine type may adapt itself to thrive in the human system, and vice versa. The contagion, or rather the propagation, of the disease among animals takes place in various ways: First, by drop infection, that is to say, little particles which are expelled during the seemingly dry cough, the same as in man. Secondly, by the discharge from the lungs or also from the glands of the throat, coughed up in the ordinary way. Thirdly, through tuberculous matter coming from the bowels. Fourthly, through secretions coming from the sexual organs (vagina and uterus). Fifthly, through the milk if the udder is tuberculous, or if the whole body of the animal is invaded by the disease. Finally, the disease may be directly transmitted from the tuberculous cow to the calf.

As to the frequency of the various ways in which the contagion takes place and the best methods of prevention, the author does not believe that he can do better than to refer those interested in this important subject to the Bureau of Animal Industry in Washington, which gratuitously sends out literature giving explicit directions as to stable hygiene, testing cattle for tuberculosis, removal and disposal of diseased animals, disinfection, and

other preventive measures. It may, however, be well to explain here what is meant by testing cattle for tuberculosis. This is done with the aid of a substance known as tuberculin. The process of manufacturing this substance was discovered by Professor Robert Koch. Tuberculin is used principally for the purpose of diagnosing tuberculous diseases in man or beast, and in certain cases it is employed as a remedial agent. It is a fluid made from cultures of the germs of tuberculosis, but it does not contain either the dead or living germs. It is sterilized by heating, thus killing the germs, and filtered through porcelain, so that after they are destroyed they are completely removed from the fluid.

In making the test in cattle, it is necessary to determine the normal temperature of the animal, and then inject a small quantity of the tuberculin. If the animal has tuberculosis, its temperature will rise within from eight to sixteen hours after the injection, but it does not suffer from tuberculosis, if the temperature is not influenced.

The tuberculin test should always be applied by a competent veterinarian, and then no danger will arise to the animals, for, when properly applied, the healthy animal is never affected by it.

Of course, there are conditions in animals, as there are in man, which predispose to the disease

The breed, as well as the conditions under which an animal is compelled to live, determines its susceptibility. We believe it to be perfectly safe to say that the suggestions made regarding the prevention of tuberculosis in man are also applicable to animals. Light, air, cleanliness, proper food, and sufficient exercise are essential in combating tuberculosis in the bovine race. After a herd has been freed from its tuberculous members and a strict stable hygiene has been instituted allowing plenty of room for every animal, there will be little danger of a new outbreak of the disease.

Tuberculosis among swine is not so rare as is usually assumed. While the disease among cows may not always be recognized by the loss of fat and general bad appearance (for even tuberculous cattle can be fatted), in swine tuberculosis manifests itself at a very early date by a marked emaciation. Very often these swine are then quickly slaughtered and the meat made into sausages. That through such procedures the health of the consumers is endangered is evident, especially when one considers that many kinds of sausages are eaten without being cooked. Tuberculosis among young swine manifests itself most frequently in the form of intestinal troubles. The main symptoms of the disease are the loss of flesh and bad appearance already mentioned, a

pale mucous membrane—that is to say, the inner lining of the mouth loses its reddish color—a marked diarrhœa, flatulency, and discharge of gases. If there is tuberculosis of the lungs, cough and vomiting are additional symptoms. In both forms of tuberculosis a swelling of the glands around the neck is often observed. When these animals are slaughtered, one can see little tubercles or elevations and ulcerations along the inner walls of the guts, and on the surface of the lungs. As soon as the disease is discovered among the animals, the sick swine should be separated from the healthy ones. A veterinarian should then be consulted, who will give directions for the destruction of the tuberculous meat and the disinfection of the sties.

The prevention of tuberculosis among swine is not so difficult when one thinks of the causes of the disease. A sucking pig can be infected by a tuberculous sow. The most frequent source of tuberculosis among hogs, however, comes from feeding them on skimmed milk and other dairy products from tuberculous cows. A few cases are also known where hogs became tuberculous from eating the expectoration of consumptives.

Tuberculosis of horses is rare and difficult for a layman to recognize. When a horse with a seemingly good appetite has a bad appearance

and loses flesh, tires easily, and is short of breath, one should think of tuberculosis. Much urinating and a high temperature (fever) are additional symptoms of tuberculosis in horses. When such conditions are discovered, it is, of course, self-evident that the animal should be isolated until the veterinarian arrives.

Tuberculosis among goats is extremely rare. In the few cases which have been recorded the origin of the disease could be traced to the ingestion of milk from tuberculous cows. Parrots and dogs take the disease when living with consumptive people, and the infection probably takes place through ingesting and inhaling infectious substances and very often through kissing.

Not only tuberculosis, but diphtheria and other diseases can be and have been transmitted through kissing cats and dogs. Such habits should be discouraged, and particularly in children.

Shipbuilders, shipowners, and captains should bear in mind that the excessively crowded quarters to which the average sailor is confined during his hours of rest and sleep, are absolutely detrimental, and even the outdoor life during the hours of work can not counteract the deleterious influence which the vitiated air of the forecastle must have on the health of the seaman. Of course, we are aware that the space given to each individual on board

ship must, of necessity, be limited; still there can be some improvement, and the ventilation can be made more perfect. For the very reason that sailors have to live in crowded quarters the danger of infection on board ship is very great. A tuberculous sailor still at work is almost certain to infect his comrades. But shipboard is not the only place where sailors are exposed to the disease. When on shore they mostly frequent and sleep in houses where the accommodations consist of bunks and straw, and where sanitation is so neglected that they are in the greatest danger of contracting the disease. To prevent the spread of infection among sailors there is but one remedy, and that is the regular periodic examination of every sailor on board ship, and the exclusion from service of individuals suffering from pulmonary tuberculosis.

Two New Methods of Antituberculosis Education.—Since the first edition of this book the following new methods have been put forward in the antituberculosis propaganda. One of them, which originated in California, is to send through the State a railroad car equipped with a complete miniature tuberculosis exhibit, a demonstrator accompanying the car from place to place. The second method is to hold a U. S. National Tuberculosis Sunday. The latter has been appointed for April 24, 1910. Sermons on the prevention and treatment of tuberculosis are to be preached to 33,000,000 churchgoers.

CHAPTER IX

THE DUTIES OF SCHOOL TEACHERS, EDUCATORS IN GENERAL, AND OF THE PUBLIC PRESS IN THE COMBAT OF TUBERCULOSIS

The child of to-day will be the man of to-morrow, and during school life, the time when the growing organism is most susceptible to good physical development and the growing mind most receptive to all kinds of teaching and example, it must be evident that much can be done in the prevention of tuberculosis.

Let us first say a word concerning school construction with a view to preventing disease in general and with special reference to tuberculosis. The essentials for the construction of a modern school are well known to all sanitarians and up-to-date architects. I would suggest only a few points. Where the site or locality does not permit of having a large playground, a roof garden which can be covered in winter is absolutely necessary. (Fig. 59.) Instead of our American windows, which can only be opened to one-half of their extent, I would wish to see in every schoolhouse,

FIG. 59. Roof Playground of Public School No. 44, New York City.

French windows, windows that slide into the wall, or those that turn on a pivot, all of which make possible twice as large an opening as our ordinary windows do. Heating and general ventilation should, of course, be of the most improved kind. The walls and woodwork of schoolrooms should be plain, in order to make the accumulation of dust virtually impossible and the cleaning easy. A smooth coat of oil paint makes a good surface. All corners should be rounded off. The interior equipment, that is to say, the school furniture, benches and desks, should be arranged so that they can easily be moved or folded together, and a thorough cleaning of the floors made possible after each daily session. It goes without saying that the drinking-cup should be replaced by the hygienic drinking fountain, which makes the use of a cup unnecessary, and thus eliminates one method of transmission of microbic disease.

Every public school should have a well-equipped gymnasium and a swimming tank with constantly running fresh or salt water, warmed to a suitable temperature in winter. (Fig. 60.) Each pupil should be given the opportunity to bathe several times during the week. To learn to swim should be made obligatory, and every class should be supervised by a competent swimming master.

FIG. 60. Schoolgirls Learning to Swim at Corlear St. Public Bath, New York City.

Leaving aside the great hygienic gain to be derived from such an installation, especially when the pupils are recruited from homes where bathrooms are rare and where regular bathing is considered superfluous, the swimming lessons will be of value to every boy and girl. In case of such disasters as the Slocum tragedy which some years ago befell residents of New York, there will be a much smaller loss of life.

There is hardly a college in existence in America where the gymnasium and the swimming tank do not form an important part of the equipment, and a college without them would surely suffer in prestige. The public school where the children of the masses receive their education should not be behind the private college in matters that appertain to health.

I am convinced that the public school which has a well-equipped swimming establishment, and which makes regular bathing and instruction in swimming obligatory for every pupil, will not only have fewer cases of infectious and contagious diseases, particularly scrofula and tuberculosis, but that the intellectual and moral status of its pupils will also be higher.

Superintendents and principals of schools should bear in mind that judicious physical exercises, outdoor life, and as much fresh air as possible are

most essential for the normal development of their pupils. There is too great a tendency in the present age to develop the intellect of our children to the detriment of their physical welfare. They work too much, they do not play enough, and they sleep too little. This overwork, because of too many school hours, too many lessons at home, and too much loss of sleep, is responsible for our national disease, neurasthenia, particularly perceptible in the young. I was deeply impressed recently, when reading the recommendations of the committee which was appointed by the French government and the city of Paris with a view to diminish tuberculosis among the school children, by the fact that they insisted upon a minimum of nine to ten hours of sleep; only after the age of ten may the hours of sleep be somewhat shortened. The duration of a lesson should likewise be graded according to the age of a child, and for small children this time should be made shorter than is now the custom. To ask the child seven or eight years of age to sit absolutely still for one hour is bordering on cruelty. I have often wondered if it would not be better to allow no children to enter a public or private school for regular attendance before the age of eight. A child predisposed to tuberculosis should certainly never enter upon school life before its eighth year.

While all the organs of a child should be given opportunity for full development, the respiratory system should receive particular care and attention. I would suggest that breathing exercises should not only be taken now and then, but that they should form an important item in the curriculum of all the schools. I do not believe that there is any better, greater, and more efficacious barrier to becoming consumptive than a good pair of lungs, and it would seem to me that it should not only be a great duty, but also a great privilege and pleasure to make strong, vigorous men and women out of all children attending school.

There are a number of systems of breathing exercises in vogue in schools and I would not wish to criticise any, but I may be pardoned for recommending the following system since during a somewhat extensive experience I have found it the best adapted for both school children and adults with a view to developing their chest capacity. It goes without saying that these exercises should always be taken in fresh, pure air, preferably outdoors; but if that is not possible, always with the windows open. In school they should be taken at the beginning of the recess, and no class should last longer than three-quarters of an hour. These exercises can be taken when the child is mentally tired, but never when physically tired. It is better to have

them play afterwards than to take these exercises when they are tired out by running or the usual gymnastics.

The teacher should strive to have his pupils learn to love these exercises as the average boy or girl loves general gymnastics. The following is as concise a description of my favorite exercises as can be given to enable one to teach them.

To begin with, the pupil has to learn to stand straight, assuming the position of the military "attention," heels together, body erect, and hands on the sides. With the mouth closed, he takes a deep inhalation (that is, breathes in all the air possible), and while doing so raises the arms to a horizontal position (Fig. 61), remains thus holding the air inhaled for four or five seconds, and while exhaling (breathing out) brings the arms down to the original position. The act of exhaling, or the expiration, should be a little more rapid than the act of inspiration.

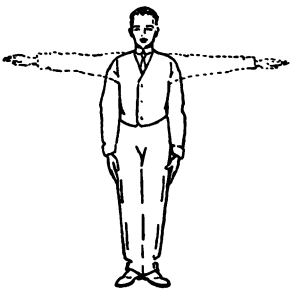

FIG. 61. Respiratory Exercise A.

The act of inhalation occupies about four, the act of exhalation about three seconds, and as has already been said, the act of retention of the air

about five seconds. The child should be taught to count mentally during these three acts so as to be systematic about holding the air. One can move the hands up and down twice, counting four, and on the fifth second begin to lower the arms and exhale.

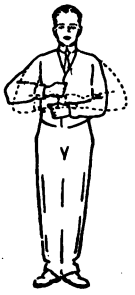

FIG. 62. Respiratory Exercise B.

When the first exercise (A) is thoroughly mastered one may commence with the second exercise (B). The pupil places his hands one above the other, in front of the chest, with the fingers bent. (Fig. 62.) The arms and shoulders make a backward movement, the hands moving apart with a motion as though wanting to tear open the chest (the fingers remaining bent) while he takes a deep inhalation, holds the breath counting four by tapping the chest four times with both hands, and at the fifth second he starts to exhale, bringing the hands and forearms into the position from which they started. This exercise has the advantage that it can be taken in the sitting position, or even when lying down on the back.

The third exercise (C) consists in raising the arms from the sides to the horizontal and then above the head (Fig. 63), taking a deep inhalation during this act; then bending backward as far as

one can and remaining in that position four seconds while retaining the air, counting the seconds by moving the hands alternately, forward and backward, and on the fifth second one exhales gradually while resuming the original position. During this exercise it should be borne in mind that when the arms are raised until the hands join, one should not bring the arms close to the head, but rather form a circle above the head by bending the arms outward enough so that the meeting of the index fingers and thumbs form a triangle.

FIG. 63. Respiratory Exercise C.

The fourth exercise (D) is for the purpose of bringing the abdominal muscles also into play, or in other words, combining abdominal and chest breathing. To this end one assumes an erect position, like the beginning of all the exercises, the hands meeting in front, with the little fingers and the edge of the palms touching the abdominal muscles. (Fig. 64.) While taking a deep inspiration raise the diaphragm, concentrating all attention on this act, and while doing so move

FIG. 64. Respiratory Exercise D.

the joined hands upward, sliding them along the thorax up to the chin, then turning them and continue to raise them until they are above the head, as in Exercise C, Fig. 63. Remain bent backward during the four seconds while retaining the air, and then exhale, lowering the arms gradually to the horizontal and to the original position of "attention."

The fifth breathing or respiratory exercise (E), which may also be called a dry swim, requires more strength and endurance. It should not be undertaken until the others have been practiced regularly several times a day for a few weeks, and until an evident improvement in breathing and general well-being has been observed. One takes the usual military position of "attention" and then stretches the arms out as if in the act of swimming (Fig. 65), the backs of the hands touching each other. During the inspiration one moves the arms outward until they finally meet behind the back, remains in this position for the usual four seconds, counting by moving the hands while retaining the air, and on the fifth second exhales, bringing the arms forward again ready to start for an-

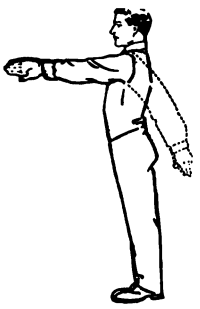

FIG. 65. Respiratory Exercise E.

other swim; or if this is the end of the dry swim, the arms return to the original position of "attention." This somewhat difficult exercise can be facilitated and be made more effective by rising on the toes during the act of inspiration, and descending during the act of expiration.

FIG. 66. Respiratory Exercise F.

It will be seen that with the aid of these five respiratory exercises every muscle of the body, from the nostril down to the toes, is put into play. The face alone is at rest and can serve as an indicator that the exercises are properly done; for it must be borne in mind that they should be taken with the muscles not actually in use, relaxed, and all unnecessary contraction of muscles or tremor-like movements must be avoided.

Of course, when out of doors one can not always take these exercises with the movements of the arms without attracting attention. Under such conditions one assumes a position similar to "attention," raises the shoulders, making a rotary backward movement during the act of inhaling (Fig. 66); remains in this position, holding the breath for four seconds and then exhales while moving the shoulders forward and downward,

assuming again the normal position. This exercise (F) can be easily taken while walking, sitting, or riding in the open air.

Young girls and boys, and especially those who are predisposed to consumption, often acquire a habit of stooping. To overcome this, the following exercise (G) is to be recommended. The child makes his best effort to stand straight, places his hands on his hips with the thumbs in front and then bends slowly backward as far as he can during the act of inhaling. (Fig. 67.) He remains in this position from four to five seconds while holding the breath, and then rises again somewhat more rapidly during the act of exhalation, assuming the original position with hands on hips.

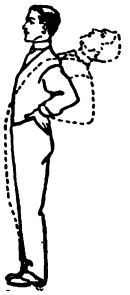

FIG. 67. Respiratory Exercise G.

The following general rule concerning breathing exercises should always be remembered. Commence with the easier exercises (A), and do not go on to the more difficult ones until the former are completely mastered. Take from four to six respiratory exercises (one of A, one of B, one of C, one of D, or one of E) or when outdoors simply exercise F, four to six times every half hour or hour, or at least four to six times a day, and on

rising in the morning and retiring at night. Continue this practice until deep breathing has become a natural habit.

These exercises are not intended for children who are already tuberculous, and they should be taught gradually and according to the strength, development, and understanding of the child. I believe them to be of incalculable benefit as a means of helping a child to overcome a tuberculous predisposition; but they are not indicated in all cases. They can do harm if the child is very delicate and not judiciously advised and guided in the gradual development of its physique as a whole. They will never be harmful to the healthy child unless grossly overdone. Children, as a rule, take kindly to these exercises, and their love for fresh, pure air, and distaste for foul air becomes very strongly developed. There should be no fear that in so-called flat-chested children these exercises can do harm. It is in these very cases that breathing exercises are indicated, for it must be remembered that in young children the bony structure yields to the pressure exercised from within. Thus, with the aid of such respiratory exercises a flat or hollow-chested child can develop into a strong, broad-chested man or woman.

It is for all these reasons that I plead to have breathing exercises made a regular and frequent

practice in schools, so as to develop all the children's chests and bodies in general and make their system as resistant as possible to the bacillus of tuberculosis. As I have already mentioned, it will be seen from the careful study of the movements described in these exercises, that all the muscles of the body are exercised, and without any violence.

Some children develop a habit of drooping one shoulder or the other, and gradually a distinct lateral curvature of the spine is developed. I have often wondered if the practice of some school authorities or teachers of forcing the little girl or boy to carry a veritable load of books every day to and from school, often up three or more flights of stairs, is not a factor in producing this unnatural and unhealthy attitude of some children. Surely, every municipality should be willing to spend enough money so that there may be duplicate books—one set for home and one set for school use—and thus the injudicious and often dangerous physical strain imposed upon the small children will be removed.

As an additional means to develop the lungs of children when in school, we can not too strongly recommend the practice of frequent singing and recitation in the open air. Singing and recitation outdoors have a most beneficial action on the

vocal organs, on the lungs, and on the heart, and will help much in the development of the chest.

Modern schools should have it a part of their curriculum for all children, according to age and understanding, to visit zoological gardens and nearby farms, to go on botanizing tours and geological excursions, and do mountain climbing. In large cities where the visits to a farm will not often be feasible, there should be school farms in or near the city so that they can be visited by the children without too much loss of time.

The accompanying picture (Fig. 68) gives a good idea how the vacant lots of a city may be utilized for such a purpose.

When one deals with the subject of tuberculosis in childhood, and particularly at the school age, one must not fail to recognize the sad fact that many pupils in the districts of the poor become predisposed to tuberculosis not only by reason of the general causes outlined in what has preceded, but by reason of particularly bad home hygiene, overwork brought about by child labor at home, and lastly, by underfeeding and malnutrition. Of the two former, the home hygiene and the child labor at home, we have already spoken in the preceding chapters. Here we wish to discuss particularly what really concerns the school authorities.

Those who have looked into the question, know

FIG. 68. Children's School Farm at the DeWitt Clinton Park, 11th Avenue and 54th Street, New York City, where children crippled by tuberculosis or accidents are taken during the daytime for play and instruction in farming and gardening. Mrs. Henry Parsons, founder and director.

that many a child has to go to school with a very inadequate breakfast and at noon has to content itself with a very meager lunch—both meals not sufficient to supply the want of a growing organism. Much has been written and said on this subject. Many pedagogic authorities and philanthropists have urged the giving of free, substantial lunches at noon time. The opponents of such a scheme have argued that it would tend to pauperize many parents who could well afford to provide their children with good and sufficient lunches. Whatever may be the arguments pro and con for providing pupils of public schools with good lunches, the fact remains that in many European and in some American communities where the children have been provided with lunches consisting of meat sandwiches and a glass of milk—hot in winter and cold in summer—they have all increased in weight, have done better work at school than prior to the inauguration of the lunch era, and last but not least, have all been made more happy.

It would seem to me that the objection to the absolutely free distribution of lunches could be met by providing them to the children at cost price. If the parents felt that they could not afford to pay this trifling amount, they should be instructed to make application to the proper authorities who would investigate the case and see to it that meal

tickets were given gratuitously to these children when it was necessary. Nearly every American city and town has its Charity Committee whose important function it is to investigate reported cases of poverty and distress, and to see that pauperization is avoided. By reporting to such organizations the families which had asked for free lunch tickets for their children, injustice and mistakes would be avoided and cases of true distress discovered. Not to make the child feel humiliated because it must receive free lunches on account of its parents' poverty, all children should have tickets; those who are able should pay for them; to those not able they should be given discreetly by the teacher or sent to the parents to be handed to the child.

The danger of occasionally giving a free lunch to a child whose parents ought to pay for it should not deter us from providing the hungry children not only with sufficient, but also with nutritious food. Sometimes the children are given money by their parents, and instead of buying substantial lunches they spend the money for candy or indigestible pastry.

All pupils and students in public, parochial, and private schools and colleges should be instructed, according to their age and understanding, in the principles of the prevention of tuberculosis and in

hygiene in general. While for older pupils much of what has been said in the preceding chapters may be readily understood and digested, for smaller children simplicity and directness are essential if we wish to make the pupil remember.

Following is an alphabet which I have compiled, believing that it will suit the understanding of younger pupils in public or private schools. In this alphabet I have endeavored to point out the numerous sources of tuberculous infection to which the child may be exposed at school, and what the child itself can do to overcome the possible sources of infection. I should like to see this alphabet, or some similar directions and rules, read and explained by the teachers in public and private schools, say about once a month, and copies of them distributed to the children to take home, to be read by the parents and reread by themselves.

ALPHABET IN THE PREVENTION OF TUBERCULOSIS.

A is for Anybody who can help prevent consumption, a child just as well as a grown person.

B is for Breathing which you should learn to do deeply; often take deep breaths in fresh air.

C is for Coughing which you should never do in any one's face, nor should you sneeze in any one's face. Turn away your head and hold your hand before your mouth.

D is for Don't. Don't swap apple cores, candy, chew-

ing gum, half-eaten food, whistles, bean-blowers, or anything you put in your mouth.

E is for Eating no fruit that has not been washed or peeled, or anything that is not clean.

F is for Fingers which should not be put in the mouth nor wet to turn the pages of books.

G is for Giving a good example to your fellow pupils and playmates by being always neat and clean, just as much so at home as at school.

H is for Handkerchief which should be used only to wipe your nose and not your slate, desk, or shoes.

I is for Illness of other kinds besides consumption which following these rules will help prevent, such as colds, measles, grippe, diphtheria, and pneumonia.

J is for Joints where children have tuberculosis more often than in their lungs.

K is for Keeping your finger-nails clean. A scratch from a dirty finger-nail may make a bad sore.

L is for Learning to love fresh air, and not for learning to smoke.

M is for Mouth which is meant to put food and drink into, and not meant for pins and money or anything not good to eat.

N is for Nose which you never should pick nor wipe on your hand or sleeve.

O is for Outdoors where you should stay just as much as you can; always play outdoors unless the weather is too stormy.

P is for Pencils which you should not wet in your mouth to make them write blacker.

Q is for Questions which you should ask the teacher if you don't understand all these rules.

R is for Roughness in play by which you may hurt yourself or your comrades. If you have cut yourself, been hurt by others, or feel sick, don't fear to tell the teacher.

S is for Spitting which should never be done except in a spittoon, or a piece of cloth, or handkerchief used for that purpose alone. Never spit on a slate, on the floor, the playground, or the sidewalk.

T is for Teeth which you should clean with toothbrush and water after each meal, or when you get up in the morning and before you go to bed at night.

U is for Unkind which you should never be to a consumptive.

V is for Vessel like drinking cups and glasses which should not be used by one child after another without being washed in clean water each time.

W is for Washing your hands with soap and water before each meal, even if it is only lunch.

X is for the X-ray which sometimes helps to discover consumption or other forms of tuberculosis.

Y is for You who should never kiss anybody on the mouth nor allow them to do so to you.

Z is for Zeal in carrying out these rules.

In order to combat tuberculosis in the public schools, the teachers should receive special in-

structions so that they may recognize the outward symptoms of the disease in childhood. A child which grows more indifferent to its studies, becomes irritable or morose, tires easily, has a little fever in the afternoon, seems to lose in weight, looks pale, shows swelling of glands, even if it does not cough, should be reported at once to the school physician for examination, as such conditions are typical and often precede the outbreak of pulmonary tuberculosis. To weigh the pupils periodically and keep a record of the results will often be helpful in discovering a beginning of the disease.

The early symptoms of tuberculosis of the bones and joints manifest themselves in lameness and easy tiring of the arm or leg affected. A light pressure in the region of the joints causes a sudden severe pain. If the spinal column is affected, the symptoms will depend upon the location of the vertebra which is attacked by the disease. For example, if this should be in the region of the neck, there will be difficulty in swallowing, in breathing, or a frequent dry cough. If any one of the vertebræ in the region of the chest is affected, a feeling of constriction like a tight band around the chest will be observed, accompanied often by digestive troubles. If the seat of the disease is in the lower portion of the spinal column, there will be irrita-

tion of the bladder and lower bowels, an inclination to much urinating, and radiating pains toward the hips.

The above mentioned pulmonary type of tuberculosis is relatively rare in children. On the other hand, among the little ones tuberculosis manifests itself very often not only as the bone and joint affections just described, but also in another form known as scrofula or scrofulosis and which might be considered almost exclusively a disease of children. The scrofulous child is usually pale, with flabby skin and muscles. The glands around the neck are swollen, and skin disease, sore eyes, and running ears are frequent symptoms. The little patient usually manifests a phlegmatic condition, but we may also find some that are nervous and irritable. The latter often have a particularly white, delicate skin which makes the veins visible. Fever is usually present in the beginning of the pulmonary type of tuberculosis; it must be borne in mind that we occasionally find a high temperature also in scrofulosis.

All children on entering school should be examined for tuberculosis or, at least, have a certificate from their family physician showing freedom from this disease.

When the child in the public school has been discovered to be tuberculous, or strongly predis-

FIG. 69. Open Air School at Providence, R. I.

posed, what then? For those slightly affected with pulmonary or glandular tuberculosis, there should be provided an open air school, such as was first established in this country in Providence, R. I. (Fig. 69), and later in New York and other cities of the United States. If I am rightly informed, the first one established in England was the London County Council open air school at Horniman Park, Lordship Lane, of which I give an interesting illustration. (Fig. 70.)

The school in Providence, R. I., was the outgrowth of the work of the local Society for the Prevention of Tuberculosis and owes its inception mainly to the enthusiasm of Dr. J. Perkins,

FIG. 70. London City Council Open Air School at Horniman Park—Resting Time.

a member of that association. The school was opened January 27, 1908. It is situated in Meeting Street, where there was an old schoolhouse that could be utilized for the purpose. The accompanying picture will show that a part of the brick wall had to be taken out in order to make it truly an open air school. The part of the building thus opened was fitted with large window sashes which let into the schoolroom air and sunshine in large quantities. The physicians interested in the plan have volunteered their services for visitation and inspection of the school, and also interested themselves in the necessary food supply. The regularly prescribed studies of the public school course

FIG. 71. Open Air School on the "Southfield," a Discarded Ferry-boat Anchored at Foot of East 26th Street, New York City.

are taught, and teachers peculiarly fitted for the kind of work required, have been appointed.

The schoolroom is large and airy, having windows on three sides. On the south side are the five large windows where the wall was removed, reaching from the ceiling nearly to the floor, so arranged with hinges and pulleys that they can be swung inward, practically opening the entire side of the building. These windows are kept open in all weathers except when snow or rain beat in. So far they have never been closed.

To temper the air at one end of the room are

two stoves, one for heating simply; the other, a cook stove, for warming the soapstones and the mid-forenoon soup. The temperature of the room in winter frequently goes below 40° F.

The room is equipped with adjustable desks and chairs on platforms so that they may be moved at will. They have been fitted to the needs of each individual child. The sun enters the schoolroom at 9:30 and remains there all day, and the desks are so moved that while breathing the fresh air the pupils also get the benefit of a sun bath.

The pupils are supplied with large, wadded bags reaching from the feet to the waist, and for extreme cold weather soapstones are provided. They wear outer wraps and hats or not, according to their needs. At 10:15, strong, hot soup is given them; a gallon a day is provided. The morning session is from 9 to 11:45, with thirty minutes intermission, and the afternoon session from 1:45 to 3:30.

Another interesting experiment in the line of outdoor schools has been made in New York in connection with a day camp for the consumptive poor of that city. Of the mission of the day camp we will speak in a subsequent chapter. Here it may simply be stated that this camp owes its existence to the enthusiasm and energy of Drs. John W. Brannan, the President of Bellevue Hospital

Board, and to his co-worker Dr. James Alexander Miller. It is located on the old discarded ferry-boat, the "Southfield," which is anchored at the foot of East 26th Street, near the grounds of Bellevue Hospital. The "Southfield" open air school (Fig. 71) admits any child of school age. Most of the children come from very poor homes, and a large proportion are orphans. All those who attend the class are either tuberculous or undoubtedly predisposed to it.

The problem of teaching the tuberculous child who comes from the districts of the poor and who, by reason of his illness, has often had more freedom than is good for him, is a difficult one. The children at the Southfield school have to learn that attendance at school is not at their own whim or pleasure; that school means work; that each child must not only come every day, but must come early enough to get his breakfast and begin work at 9 o'clock.

We have already mentioned phthisiophobia in relation to adult consumptives. Some people carry their fear so far as to include the children. I know that in a western town strong objections were made recently to the establishment of an open air school. To all those sharing such a prejudice, I may say that my personal experience and that of the teachers of schools for tuberculous

children, has shown that children as a rule cough less and expectorate less than adults; that when instructed to be careful they usually are so; and that in mental equipment and deportment the tuberculous children are, as a rule, on a par with any unexceptional class of children from average homes. In one of our New York open air schools, with which I am familiar, the children come from more destitute and worse regulated homes than the average, yet these little ones have become just as ambitious to work and just as well behaved as any others.

There must come a time, and soon, when we will have to have a good many more open air schools, not only for the predisposed and actually tuberculous children, but also for the seemingly normal, healthy child. It is well known to all pathologists and to physicians with large experience in the treatment of diseases of children, that many a child has a latent tuberculosis which does not show nor develop until the age of manhood or womanhood. Thus, it would seem to me that to increase the resisting power of the child during the school age (8 to 14), we should give it an abundance of fresh air. In some sections of our country, such as southern California and some of the southern states, I should think the climate would permit open air schools pretty

nearly all the year around. In some other sections they could be held at least part of the spring, summer, and fall, provided the children are properly clad.

A child afflicted with more advanced pulmonary tuberculosis should not even go to the public open air school of the city. It should be sent to a sanatorium. The same must be said of children afflicted with bone and joint tuberculosis. For both classes of children the sanatorium treatment is essential. Surgical cases at times need to be operated upon.

We reproduce here a picture of the first sanatorium established for tuberculous children in France, known as l'Hôpital pour les Enfants Tuberculeux à Berck-sur-Mer. (Fig. 72.) It is maintained by the municipality of Paris, and attached to it is a public school. Children suffering with the surgical type of tuberculosis are here treated and cared for. Those able to pay are charged a moderate price and the poor are treated gratuitously. We also reproduce the playground in midwinter of our first American Sanatorium for children suffering with tuberculous bone diseases, at Sea Breeze, Coney Island. (Fig. 73.)

It goes without saying that no sanatorium for children should exist without proper educational facilities so that the intellectual development of the

FIG. 72. Seaside Sanatorium and School for the Tuberculous Children of the City of Paris. Located at Berck-sur-Mer.

FIG. 73. Playground in Midwinter for Tuberculous Children at Sea Breeze, Coney Island, New York.

child may go hand in hand with its physical improvement.

In Boston this work is under the direction of Dr. Edwin A. Locke, and while teacher and physician work in perfect harmony, the latter is the supreme authority in the mental as well as the physical care of the children.

A tuberculous teacher, that is to say, one suffering with an open and active pulmonary tubercu-

losis, coughing and expectorating, should not, for his own sake as well as that of the pupils, be permitted to teach in public schools. He should be given opportunity to be cured of his disease either in a sanatorium, a health resort, or at home.

If his tuberculous trouble has been arrested or cured, in order to have the cure made more permanent or to prevent a relapse, he should be employed as a teacher in one of the open air schools or in the school attached to a children's sanatorium.

Since tuberculosis is very justly considered a disease of the masses, the teaching of hygiene and prophylaxis of tuberculosis should be made a part of the curriculum in high schools, colleges, seminaries, and universities where teachers and educators receive their training.

Evening lectures on hygiene and tuberculosis, given for the adults in the public school buildings, such as were inaugurated some years ago by Dr. Henry M. Leipziger of the New York Board of Education, have proved a most valuable feature in educating the public on this vital subject. From personal experience I know that intense interest has been manifested by the public in such lectures.

One of the best educators of the masses, how-

ever, is the public press. Short articles on the various phases of the tuberculosis problem written by competent physicians in the language of the people, should appear frequently in every daily newspaper. A vast amount of education can thus be effected and people who can not be reached by any other means will be made familiar with the principal points in the prevention of tuberculosis.

There is also another way in which the public press, more than any other agent, can serve the public weal and the anti-tuberculosis cause at the same time. That is by refusing to publish any patent medicine advertisements, secret remedies, methods which promise sure consumption cures, or anything that may in any other way mislead the public and prevent them from seeking proper medical advice and scientific treatment while there is still a chance for improvement and cure.

School authorities or other educational bodies should consider the education of the future mothers of the nation an important factor not only in tuberculosis, but also in all other diseases. There should be no girls' schools where cooking and housekeeping do not form a part of the curriculum. The duties of the future mother or housewife should be taught to our girls, and the now ex-

isting uneducated mothers and housewives should be taught what they do not know. The rearing of healthy children is the most valuable asset to a nation's strength and prosperity.

An institution known as "Caroline Rest" was recently established in Hartsdale, Westchester County, N. Y., by Mr. Geo. H. F. Schrader, in memory of his mother, and presented to the New York Association for Improving the Condition of the Poor. This institution is not only a sanatorium for mothers with infants, but serves above all as a school where, under the most favorable conditions, mothers of the poor will receive instruction in the duties of motherhood, in personal hygiene, the care of their children, and the right conduct of their homes. It was planned to meet the pathetic needs of that great number of poor mothers who are compelled to leave their beds within a week after childbirth, in order to return to the factory or to the care of the household, thus laying the foundation of a lifelong invalidism.

The work at Hartsdale is supplemented in the city by the Caroline Rest nurses who visit mothers before and after confinement, and through instruction and special care promote their health and that of their children. The experience of the Caroline Rest nurses has definitely shown that by

protecting the health of mothers before the coming of the new life, it is possible greatly to reduce the mortality among infants under one year of age, of whom approximately 17,000 now die in Greater New York every year from causes largely preventable. What such care of mothers and such prenatal and postnatal care of children means in the prevention of tuberculosis must be evident.

There exist already in a few cities in the United States what are known as practical housekeeping centers. The first of these was established in 1901 by Miss Lillian D. Wald, head of the Henry Street Nurses' Settlement of New York City. Such a center is an institution in the shape of a model flat or model house, and teaches the inexperienced mother or girl, by precept and example, how to cook, how to train children, and how to keep even the modest home neat, clean, and attractive. These centers meet the need of the inexperienced mother of to-day, of to-morrow, and of the mother ten years hence.

To show the value of such educational and practical housekeeping centers, I can not do better than quote from the writings of that well-known teacher of mothers and girls, and philanthropic worker, Mrs. Florence Kelly. Here is what she has to say:

"If the practical housekeeping centers can be

made permanent and numerous enough, if they can be made as much a part of the life of the community as the public schools are now, intergraded in time with the schools, these problems—intemperance, infant mortality, and reduced vitality of the working class families—can be reduced to their lowest terms. Clean, orderly homes, in which air is pure, food is attractive and wholesome, and beds are clean and comfortable, give the baby the maximum chance for life and health, and his father an opportunity for keeping himself fit for his work, and a hope of escaping his deadliest enemy—drink and tuberculosis."

Finally, educators of all kinds should not fail to impress upon the minds of those with whom they come in contact that whatever is done for the anti-tuberculosis crusade is for the good of the whole community. Many parents have been antagonistic to the medical inspection of school children, nevertheless this, and the special examination for tuberculosis so thoroughly carried out in New York under the direction of Dr. Walter Bensel, the Sanitary Superintendent, Drs. John J. Cronin and Josephine Baker of the Department of Child Hygiene, and Dr. Bertram H. Waters, Chief of Municipal Clinics, have been of incalculable service in the early recognition of tuberculosis and have saved many a young life.

CHAPTER X

THE DUTY OF THE CLERGY, PHILANTHROPISTS, CHARITABLE INDIVIDUALS, AND CHARITY ORGANIZATIONS

The clergyman has as great a mission to perform in the prevention of tuberculosis as a disease of the masses as anybody else. Every clergyman should inculcate ideas on general sanitation, the value of good, pure air and proper living into the minds of the people under his charge. He and they should feel a pride in having their churches and Sunday schools hygienically constructed and well ventilated. To close the church doors and all the windows immediately after divine service on Sunday, is an unpardonable hygienic sin which no clergyman ought to allow. A church should be aired before being closed for the week and again before service is held. The air in a church or Sunday school should be as good as anywhere, if not better. Fixed carpets should not be used in places of worship where many people congregate. Kissing the bible when taking an oath should be discouraged by jurists and divines. Bacteriological

examinations of bible covers used for that purpose have more than once shown the danger of such a practice. The bacilli of tuberculosis have often been found on these covers in great numbers.

In Roman and Greek Catholic churches all articles of adoration such as crosses, statues, and pictures, which are often kissed by devout Catholics, should be disinfected frequently. I am pleased to note that there are some very progressive priests in the Roman Catholic church who are fully aware of the danger which may come from such practices and who insist upon a thorough cleansing of these articles. The Bishop of Fano in Italy even goes a little further. In a circular issued by him, he asks the priests of his diocese to comply with the following rules:

1. In every church the floor must be regularly cleaned with sawdust, saturated with a strong sublimate solution. This thorough cleaning should take place particularly after holidays when great masses of people have visited the church.

2. Every week all ordinary chairs and confessional chairs must be thoroughly cleaned with moist rags.

3. The grate of the confessional chairs must be washed every week with lye and then polished.

The ritual circumcision practiced according to the orthodox Jewish rite may, if the operator hap-

pens to be consumptive, be the cause of the infant contracting tuberculosis. The operation of circumcision, when skillfully and rapidly performed, is in itself trifling; but the application of the operator's lips afterwards for the purpose of stopping the bleeding makes it dangerous.

Since it will be difficult to stop this practice by a simple protest on the part of physicians, and as the law can not interfere with the free exercise of a religious rite, I should suggest as a remedy that only such persons should be allowed to perform circumcision as have shown the necessary skill before a medical board of examiners, and that every time they are called to perform the rite they should submit themselves to a medical examination. Only when bearing a certificate from a regular physician, stating the absolute freedom from specific diseases, should they be allowed to perform ritual circumcision. As another reliable measure against the possibility of inoculating the child, when the parents insist upon the orthodox method of circumcision, is the suction by the aid of a glass tube, as practiced in France and Germany.

The common communion cup in Protestant churches should be replaced by individual communion cups. This practice, while accepted by many liberal churches, is not looked upon with

favor by those confessing the more orthodox creeds. For these a cup has been devised which has the advantage over the ordinary cup that the secretions of any one mouth do not come in contact with another. The device consists of an ordinary chalice about five inches across the opening, with an attachment of metal which each communicant may have and place upon the rim of the chalice. If any of the fluid remains after the communicant has imbibed, it flows into a false cup and into a reservoir at the bottom of the chalice. The supply cup is separate in the center of the chalice, and is so arranged that it automatically fills every time that it is used, the amount being regulated at will. When they do not have the individual metallic mouth clips to attach to the rim of the chalice, a number of layers of thin waxed paper, cut and formed to fit tightly as a pad, are attached to the rim. After the communicant has used the cup, by a sweep of the thumb and forefinger the individual wax paper which has been used is removed from the pad and a clean one is revealed. (Fig. 74.) This device is the invention of a Swedish clergyman, Rev. C. J. Ljunggren, of Providence, R. I., whose need for a device of this kind led him to invent this ingenious substitute for the ordinary cup.

While one now less frequently sees patent medicines and sure consumption cures recommended

or endorsed by thoughtless ministers, such recommendations still appear now and then in the public press. It is self-evident that no minister, true to his calling, should ever do this, nor should religious newspapers lend their columns to advertise remedies, the action of which on the invalid is harmful ninety-nine times out of a hundred and is perhaps never helpful.

FIG. 74. Rev. Ljunggren's Hygienic Chalice.

Besides practicing the preventive measures just enumerated, the ministers of the various creeds can be helpful by coöperating with physicians in the anti-tuberculosis crusade. Thus very recently, interesting pamphlets on the prevention of tuberculosis were written by the Rt. Rev. James A. McFaul, Bishop of Trenton, and the Rev. Dr. Joseph Krauskopf, a distinguished rabbi of Philadelphia. In Rochester, N. Y., the Rev. Paul Moore Strayer honors the medical profession by inviting physicians, now and then, to occupy the pulpit on Sundays to preach on health topics, and particularly on tuberculosis. My friend, the Rev. John Haynes Holmes, honored me recently by an invitation to speak on tuberculosis on two

successive Sundays before the Good Citizenship Class of the Unitarian Church of the Messiah of New York.

Nearly all leading denominations in the United States have now either sanatoria or hospitals for the care of tuberculous patients. It is interesting to note that the Philadelphia Protestant Episcopal City Mission opened a hospital for consumptives as early as 1877. This institution has grown to be one of the most important in the United States. As will be seen from the accompanying picture (Fig. 75), it now occupies a large tract of land with numerous buildings and cottages, on Chestnut Hill, Philadelphia.

Under the auspices of the Roman Catholic Church there are numerous sanatoria throughout the United States, and in New York City this church renders particular service to the tuberculosis cause by admitting to the St. Joseph and the Seton Hospitals (Figs. 76 and 77) not only early but also advanced cases, thus removing centers of infection from many homes.

The National Jewish Hospital, which was founded by the Jewish people as a contribution to the world's battle against the white plague, is entirely free and for destitute consumptives only—no paying patients are received. It was started some ten years ago, and is accomplishing a great

FIG. 75. The Philadelphia Protestant Episcopal City Mission House for Consumptives. Founded in 1877.

FIG. 76. St. Joseph Hospital for Consumptives in All Stages of the Disease, New York City.

deal of good by curing many cases and reëstablishing the earning capacity of pulmonary invalids. This institution receives incipient cases only. (Figs. 78 and 79.)

What is most interesting and gratifying from a humanitarian point of view is that, while all these institutions are nominally under Protestant, Roman Catholic, or Jewish direction, all of them are non-sectarian in their work, and patients of all creeds and color are received and cared for. It must not be forgotten, however, that all these hospitals are taking care of the consumptive poor,

FIG. 77. Nazareth Branch of Seton Hospital for Consumptive Women and Children, in Charge of the Roman Catholic Sisters of Charity.

and in order that their good work shall continue and enlarge they must receive the generous financial support of all those able to help their suffering fellow-men.

There is one more field in which the clergyman who is in sympathy with physicians and who earnestly desires to diminish diseases of all kinds, and at the same time diminish social misery, can be helpful. Both disease and social misery are oftentimes increased by custom and tradition, and the method of burial of the dead has no little to do with the welfare of the living. Medical history is full of incidents showing that contagious and infectious diseases have been propagated from superficially buried bodies which had succumbed to

FIG. 78. The National Jewish Hospital for Consumptives at Denver, Colo. Men's Pavilion. Only Incipent Cases Are Admitted.

infectious diseases. This may happen through a washing away of the soil of cemeteries, through disinterment of the individual graves, or the removal of the burial ground. Men and beasts alike have been known to become diseased and die from such causes.

But it would seem that neither floods nor disinterments are necessary in order that the pathogenic microörganisms may work their way to the surface and then be the cause of dangerous infectious diseases. Pasteur's experiments in regard to splenic fever of cattle (charbon) are sufficient evidence of this. It would seem that the burying

FIG. 79. The National Jewish Hospital for Consumptives at Denver, Colo. The Balconies of the Circular Pavilion for Women.

of any body when the cause of death was an infectious disease, such as cholera, yellow fever, typhoid fever, diphtheria, tuberculosis, etc., may endanger the living. According to Pasteur and the more recent experiments of Lortet and Despeignes, the seemingly innocent earthworm plays a very important part as an intermediary in bringing to the surface living pathogenic (disease-producing) microörganisms. The observations of Lortet and Despeignes refer particularly to Koch's bacillus of tuberculosis. These microörganisms are capable of being ingested and ejected by the earthworm without losing their virulence. The worms swallow earthy matters, and after separating the digestible and serviceable portion they reject the remainder in little coils or heaps at the mouths of their burrows. In dry weather the worm descends to a considerable depth and brings up to the surface particles which it ejects. It would thus seem that even the deeper burial of the bodies is no guarantee that living infectious microörganisms will not be brought to the surface.

Cremation has often been advocated, by any number of physicians and sanitarians, in all cases of death from infectious diseases, but it is only since the experiments of Lortet, Galtier, Gartner, and Schottelius that tuberculosis has been included among them. These experiments have demon-

strated conclusively that the tubercle bacillus can resist putrefaction for years and be brought to the surface by the earthworm.

But it is not only because it is a sanitary measure that I plead for cremation. I claim that this simpler and more expedient way of disposing of the dead would be an economic advantage to many individuals and to every community at large.

In an address to the Chicago Medical Society, advocating cremation, Dr. Charles W. Purdy made some striking comparisons to show what a burden is laid on society by the burial of the dead. According to his carefully prepared estimate, one and one-fourth times more money is expended annually in funerals in the United States than the government expends for public school purposes. Hundreds of acres of land are annually consecrated to the burial of our dead. In many instances, and particularly in the vicinities of large cities, burial lots are at a premium. In some of our fashionable cemeteries in New York one can not buy the few feet of ground needed for the slow, loathsome decomposition of his body for less than $1,000; while cremation, which means a rapid and sanitary decomposition, need not cost more than $25.00.

In my work in tuberculosis I have been led to become an ardent advocate of cremation, especially in our large communities, and particularly for peo-

ple of moderate means or the really poor. Perhaps the danger of propagation of tuberculosis through the graveyard, as compared with other diseases, is relatively small; but the thousands of acres which, near large cities, are devoted to the dead and are thus useless, we need for the living.

According to statistics kindly furnished me by Dr. W. H. Guilfoy, Registrar of Records of the City of New York, there are 200 funerals a day, which means 73,000 a year, out of which only the small number of 1,000 are cremated. Many a model tenement house, where people might get light and air, could be built if the dozen or more graveyards of many of our large cities were laid out in building lots surrounded by little parks and playgrounds. There the living children could play and the living mothers and wives of our laboring men could get a breath of air, which it is so difficult to get in the present crowded conditions of the average tenement districts. Would not this mean prevention of tuberculosis and other diseases due to overcrowding, among old and young alike?

In my labors among the consumptive poor I have always been painfully impressed by the expense which the ordinary funeral, including the buying of a burying lot, entails. Consumption is a costly disease. If the patient does not get well within a year, if the disease becomes chronic and

incurable there is invalidism and loss of earning capacity often for two, three, and more years. When the end comes, there is no end to the expense. A costly coffin, expensive ceremonies, and a costly burial lot sap, in many cases, every resource of the relatives. I have known poor people to go into debt for the sake of a decent funeral, for which it took years to pay. In view of such experience, which all physicians practicing among the poor must have had, are we not justified, is it not our duty, to plead for the relatively inexpensive disposition of the dead by cremation, and for simple funerals?

I am fully aware that there are valid objections, first on medico-legal grounds, and second on religious grounds to which a plea for cremation must give due consideration. The medico-legal objections could be met with by permitting no cremation of any person, the causes of whose death was not perfectly known, without a thorough post-mortem inspection of the entire body and chemical examination of the stomach and intestines. I would suggest a law that a complete report of the post-mortem findings be handed to the proper officials before a certificate for cremation is granted.

To the objection of cremation on religious grounds, it is not my province to reply. Religious and ethical sentiments must be honored and re-

spected, but I am quite sure that the clergy of any denomination, even those opposing cremation, will agree with my plea for more simple and less costly funerals which, in the families of the consumptive poor, are so often productive of great hardship.

In a modern book on tuberculosis, a chapter on the duties of the clergy in this great problem can not be considered up to date without taking cognizance of the anti-tuberculosis work of what is now known as the Emmanuel Church movement. While this work in its relation to tuberculosis has already found numerous imitators, it originated with Dr. Joseph H. Pratt and the Rev. Dr. Elwood Worcester of Boston. It was the thorough scientific training of the physician, the broad humanity of the clergyman, and the coöperation of sympathetic, devoted, and philanthropic friends which made it possible to obtain most surprising results in the treatment of cases in all stages of the disease at their homes. To stimulate similar work where it is not yet sufficiently understood, I will explain the methods whereby Dr. Pratt and his co-workers obtained such unusually good results. Of twenty-eight patients in all stages of the disease no less than eighty per cent were reported cured.

These patients were treated according to their condition, some as long as two years, in "groups" in or near their homes, after the most approved

hygienic and dietetic methods with rest in the open air, and constant supervision by nurses or friendly visitors, under the direction of an experienced phthisiotherapeutist. Dr. Pratt has given this method of treating a number of patients in their homes the name "class method." He emphasizes that in order for it to be successful the classes should be small and the doctor, the friendly visitors, the nurses, and the patients should establish close relations with each other. It is generally understood that when there are more than twenty-five patients, a second class should be established.

From Dr. Pratt's own writings on this subject I quote the following:

"The record book is an essential part of the class method. The patient records his temperature, his pulse-rate, the food he eats, and every other detail of the daily life. He is required to enter in this diary the number of hours he is out-of-doors and the amount of milk he drinks. The book is inspected by the friendly visitor at every visit and by the physician at the weekly meeting. In my experience I have never found that keeping the records leads to introspection or depression of spirits. It is a great aid in carrying out the details of treatment. The members take pride in keeping neat records. It encourages the members to persevere.

"The weekly meeting is the distinct feature of the

class system. It is held in a large cheerful room at the Massachusetts General Hospital. The class meeting is a pleasant social hour for the members. One confided to the friendly visitor that the meeting was her weekly picnic. Made up as our membership is of widely different races and different sects, they have a common bond in a common disease. A fine spirit of camaraderie has been developed. They never discuss their symptoms, and are almost invariably in good spirits. Frequently our graduates (cured patients) drop in at the meeting to get weighed and to greet their old associates. The members are weighed each week and their pulse and temperature taken by the friendly visitors, assisted by one of the senior members. The greatest gains in weight are posted conspicuously each week on the blackboard, and the member who remains out-of-doors the greatest number of hours in the month has his record exhibited. This stimulates a spirit of healthy emulation. One patient was out-of-doors seven hundred and six hours in a month, an average of nearly twenty-three out of the twenty-four. Some of the sickest members gain this distinction. The favorable cases that are making rapid progress toward recovery infuse a spirit of hope in all.

"After the strength of the member has been tested and increased by carefully prescribed amounts he is graduated and allowed to work. Home treatment has one advantage over the sanatorium in the fact that if health has been regained by leading the out-of-door life at home, it is easy to keep up the hygienic habits after recovery. A place for sleeping out-of-doors and a

FIG. 80. An Emmanuel Church Class Patient Taking the Open Air Treatment in a Back Yard of a Boston Tenement.

reclining chair for resting in the recumbent posture are still available. Our graduates continue to sleep out-of-doors or with their heads in open windows."

We reproduce here a very interesting illustration (Fig. 80) showing how, under seemingly adverse circumstances, it has been possible for an Emmanuel Church class patient to have his outdoor sleeping at night and open air treatment during the day. As will be seen the tent has been erected in the back yard of one of the poorest districts of Boston. Nevertheless, the patient has what he

needs—fresh air day and night, good food, and medical supervision. But he has something more which the Emmanuel people have known how to provide and which accounts in no small degree for the admirable results which they have obtained. Without imposing their religious convictions upon any one, the doctors of divinity went among these patients and, assisted by friendly visitors, inspired them with hope and comfort; talked to them of home, children, wives, and husbands. Then the friendly visitors looked after the wives or children, mothers or sisters in the home. In all instances when the breadwinner was the invalid, these good women took it upon themselves to see that there was nothing wanting in that home that was without a breadwinner. In other words, the invalids and their families were taken care of by the Emmanuel Church people as long as there was need for it. Perhaps, never before in their lives had these individuals so much peace of mind, happiness, and contentment as when lying on their reclining chairs taking the rest-cure in the open air, thinking of their well-provided family and their prospective recovery; and having at the same time the assurance given to them that employment would be provided when they were again able to work—and all this without being away from home. The element of homesickness, so distress-

ing to many sanatorium patients, as well as the element of worry and anxiety, did not exist. All these psychological factors are responsible for the success of the Emmanuel Church movement as far as tuberculosis is concerned, as well as the hygienic, dietetic, and fresh air treatment.

I approve most highly of such humanitarian work as this, inaugurated on the one hand by a doctor of medicine and on the other by a doctor of divinity. There is but one word of warning which I feel in duty bound to express in all frankness: the seemingly little medicinal treatment which is needed in many tuberculosis cases may tempt the clergyman or layman to undertake the treating of tuberculous patients without any, or without a very thorough supervision or guidance by medical men. If in any disease the physician is needed, it is certainly in tuberculosis in no matter what stage.

In the preceding chapter we have spoken of the duties of public officials, of municipal boards of health, and of physicians; but no matter how great their efforts may be, it will be difficult to solve the problem without the coöperation of private philanthropy. One of the most successful ways to work together is doubtless to form a special tuberculosis committee composed of representatives of the local health board and other municipal

departments, the clergy, physicians particularly interested in the tuberculosis problem, philanthropic men and women, and the representatives of charitable organizations. Such a committee the author was privileged to help form for the City of New York in the year 1902. The following is in brief the purpose of this Committee:

1. *Research:* Into the social, as distinct from the medical, aspect of tuberculosis. The study of the relation between the disease and overcrowding, infected tenements, and unhealthful occupations.

2. *Education:* The publication of leaflets and pamphlets; the giving of lectures with and without stereopticon views; the use of a travelling tuberculosis exhibit designed to emphasize the fact that tuberculosis is a communicable, preventable, and curable disease; the dissemination of knowledge concerning the means and methods to be adopted for the prevention and cure of tuberculosis.

3. *Treatment:* The encouragement of movements for suitable public and private sanatoria; both for advanced and for incipient cases, for adults and for children, for free care, and also for the care of those who are able to pay moderate fees.

4. *Legislation:* An effort to secure the enactment of legislation looking toward the control of such recognized causes of contagion as spitting in pub-

lic places, the dry sweeping of streets, the use of dark rooms in tenements for sleeping purposes, etc.

After seven years of existence, the Committee on the Prevention of Tuberculosis of the Charity Organization Society of the City of New York could point to the following accomplishments, which were summarized by Mr. Lawrence Veiller for a report for the International Congress on Tuberculosis which convened in Washington, D. C., in the fall of 1908. This Committee

1. Made the first comprehensive study of the social aspect of tuberculosis.
2. Formulated standard schedules for recording the social history of tuberculosis cases.
3. Made a comprehensive study of institutions and societies for the treatment of tuberculosis in the United States and Canada—publishing a Directory of same in 270 pages.
4. Made a careful study of tuberculosis among Negroes in New York City.
5. Made a comprehensive investigation of conditions in New York City lodging houses with reference to tuberculosis.
6. Made an investigation of conditions in the New York Federal Post-Office building with reference to tuberculosis.
7. Made an investigation of country employment for city consumptives.

8. Made a comprehensive inquiry into the whole matter of the relief and care of tuberculosis in New York City.
9. Made a thorough study of the possibilities of home treatment of the tuberculous sick in New York's tenement houses.
10. In coöperation with the New York Milk Committee, made a comprehensive study of bovine tuberculosis in New York State and its methods of regulation; and lastly,
11. Made a study in New York City of the prevalence of tuberculosis among workers in certain industries—based on medical examinations.

In the educational line, this Committee

1. Originated the plan for publishing tuberculosis maxims on the back of street car transfers—50 million a year circulated this way.
2. Distributes 250,000 Circulars of Advice regarding tuberculosis each year to the public, through Labor Unions, Factories, Department Stores, Settlements, Churches, etc.
3. Has given 733 popular lectures on tuberculosis to audiences of 148,125 people—in English, Yiddish, Italian, Bohemian, French, and German—228 lectures to 78,640 persons this year.
4. Originated the permanent traveling Tuberculosis Exhibition as a means of educating the community.—Exhibit shown throughout each year in Settlements, Churches, Clubs, etc., and in

stores on crowded thoroughfares—viewed by 150,000 people in six weeks at one place this year.

5. Established a weekly press service to 200 newspapers in New York State—furnishing news matter about tuberculosis prevention and treatment.
6. Carried on the first active educational campaign among Labor Unions—securing the coöperation of the United Garment Workers of America, Central Federated Union, and American Federation of Labor, etc.
7. Organized a Committee on the Prevention of Tuberculosis among Negroes in New York City.
8. Issued a circular to 8,000 physicians against sending consumptives out West or to the country except under proper conditions.
9. Issued a strong pronouncement against "Consumption Cures."
10. Published a comprehensive book on the prevention of tuberculosis—388 pages.
11. Published and distributed 1,000 copies of a report on Bovine Tuberculosis in New York State.
12. Published the first Directory of Institutions for the treatment of tuberculosis in the United States—270 pages.
13. Published and distributed to physicians and others 6,000 copies of a report on Home Treatment of Tuberculosis in New York City.
14. Originated a plan of distributing art posters, with tuberculosis advice in them, in tenement homes—10,000 distributed to Italians.

Furthermore,

1. It took steps to bring about formation of more special tuberculosis clinics in the dispensaries of New York City.
2. It was also an agency in New York City to advocate formation of special tuberculosis clinics for children.
3. It took active part in urging and bringing about the building of a Municipal Sanatorium—prepared and published architects' plans, which formed basis of official report to the Mayor.
4. It secured funds for special relief of consumptives in their homes—for special diet, payment of rent, wage loss, clothing, bedding, pensions, etc.—$33,496 thus expended in 20 months.
5. It brought about special visitation by physicians, of Russian and Polish families in their homes.
6. It secured opening at night of special tuberculosis clinic for Negroes. Colored nurses' services furnished by Committee.
7. It sent a selected number of consumptives out of the city for country treatment, and defrayed their board and expenses.
8. It brought about examination at special clinics of children in tuberculous families—defrayed cost of medical examinations of same.
9. It established First Day Camp for tuberculous patients in New York City on abandoned ferry-boat "Southfield."

10. It has medical examinations made of workers in different trades to determine extent of tuberculosis—cost defrayed by Committee.
11. It brought about establishment of District System of Tuberculosis Clinics in New York City and union of existing agencies in new association of tuberculosis clinics.
12. It formulated comprehensive plan of hospital, sanatorium, and dispensary treatment for the tuberculous sick in New York City.
13. From time to time it has investigated adequacy of existing hospital provision for tuberculous sick and urged the authorities to meet it more adequately.

Regarding legislation, this Committee has shown the very important part such a group of men and women can play by promoting just laws and furthering the interest of consumptives and the public in general, and by opposing unjust and inhumane laws:

1. It took active part in the legislative campaign for appropriation for completion of the Free State Hospital at Ray Brook.
2. It took active part in opposing law, making difficult the establishment of tuberculosis sanatoria in the State.
3. It has repeatedly protested against legislation weakening the Tenement House Laws.

4. It supported legislation authorizing State Commissioner of Labor to require adequate ventilation in factories.
5. It supported legislation authorizing appointment of Medical Inspector in the State Department of Labor.
6. It formulated Bill for the Regulation of Bovine Tuberculosis, which served as the basis for an important amendment to the Agricultural Law.

The New York Charity Organization Society has a committee under the chairmanship of Professor Theodore C. Janeway, M. D., which is for the purpose of finding employment for the handicapped, including tuberculous invalids able to do some work. The value of such a committee must be obvious when one considers how frequent tuberculosis is among the laboring population.

Diet kitchens which provide good, pure milk, free of charge to the destitute sick, are valuable aids in the treatment and care of the tuberculous poor. The milk is given to the patients upon the written recommendation of the attending physician. The New York Diet Kitchen Association, under the presidency of Mrs. Henry Willard, has now eight branches throughout the city. The Association does magnificent work and deserves the support of all those able to give it.

The Russell Sage Foundation, by substantial money contributions, has been helpful in aiding the various

national, state, and local anti-tuberculosis agencies in their educational propaganda.

It was reserved to three philanthropists of our own country to found institutions for the specific purpose of teaching physicians and training them in tuberculosis science. Mr. Henry Phipps of New York is the founder of the Phipps Institute for the Study and Prevention of Tuberculosis in Philadelphia, and, furthermore, he established the Phipps Dispensary in connection with the Johns Hopkins Medical School at Baltimore. Mr. John D. Rockefeller established a special tuberculosis hospital in connection with the Rockefeller Institute in New York; and Mr. Andrew Carnegie gave toward the establishment of the Robert Koch Institute of Berlin for the Study of Tuberculosis, the magnificent sum of $250,000 (1,000,000 marks). May the examples given by these three generous philanthropists find emulation everywhere. To create opportunities to study tuberculosis in all its aspects, and to send out well-trained physicians, is, indeed, indispensable if we would wish to master the disease.

In this connection it should be said that the scientific research work regarding tuberculosis must be encouraged, and careful and humane animal experimentation should not be opposed. It is, thanks to animal experimentation that many of our infectious diseases have now become, not only less frequent, but more surely and rapidly cured. Anti-vivisectionists should remember that scientific experimenters never purposely torture animals and that, for example, the

horses from which antitoxine for diphtheria is produced, do not suffer. Let these good people, furthermore, recall that it is to the experiments on a few hundred guinea pigs and rabbits that the discovery of antitoxine is due, and that the consequence is that the mortality from diphtheria has been reduced from seventy or seventy-five per cent to five or six per cent. This means that ninety-four to ninety-five diphtheritic children are saved out of every hundred, instead of twenty-five or thirty as formerly. Let every American mother remember these facts when she is asked to aid in the protests against scientific vivisection.

It may seem ungracious to suggest to a philanthropist what it might be best for him to do in his desire to help his fellow-men; but when one peruses the varied activities of a charity organization society, such as those enumerated above, one can not help thinking that from a concerted action of the philanthropists and such a society, the greatest benefit for the tuberculosis cause must be derived.

The officers of an organized charity organization society will know where model tenement houses are most needed, and what kind of tuberculosis institution is best fitted to meet existing demands. Thus, for example, at the time of writing this book there is in the City of New York the greatest need of taking care of advanced cases of tuberculosis who constitute centers of infection in the ten-

FIG. 81. Panoramic View of the Adirondack Cottage Sanatorium, Trudeau, New York. For Incipient or Early Cases. Semi-philanthropic. The Uniform Charge is $5.00 per week.

ement houses; and an urgent, crying need of the establishment of sanatoria for tuberculous children for whom, with the exception of Sea Breeze, there is now almost no provision. I am convinced that philanthropists can not render greater service to the anti-tuberculosis cause at this time than by helping the New York Tuberculosis Committee in its efforts to suppress centers of infection, and in its endeavors to prevent the tuberculous child of to-day from becoming the consumptive adult of to-morrow.

With the help of the clergy, of philanthropists, of charitable individuals, and charity organizations, a great deal, of course, can be done in the direction of establishing sanatoria for tuberculous adults and children, hospitals for the advanced cases, day camps, night camps, and tuberculosis classes. Of the economic value of sanatorium treatment in tuberculosis we have spoken in Chapter VII. By means of the sanatorium treatment, that is to say, the treatment of the tuberculous in institutions especially established and equipped for the purpose, eighty to ninety per cent of incipient cases are cured, or their disease sufficiently arrested so that they can again become breadwinners. It has been demonstrated that with the aid of the sanatorium treatment patients can be cured in all climates; and this is very important when we consider that tuber-

FIG. 82. Adirondack Cottage Sanatorium. Piazza of the New Medical and Reception Pavilion.

culosis is a disease which is prevalent everywhere, and that it would be inexpedient and unwise to send every patient to what was formerly known as a "specific climate" particularly effective in the treatment of tuberculosis.

There are now throughout the civilized world any number of private and public sanatoria situated in various altitudes and latitudes. The United States has not been behind in establishing institutions of this kind. In Chapter VII we gave a complete list of existing state sanatoria. The num-

FIG. 83. Marilla C. Wheeler Cottage of the Adirondack Cottage Sanatorium, Trudeau, New York.

ber of private institutions in the United States as well as in other countries is, of course, many times greater, and their number, I am happy to state, is constantly on the increase. According to the records of Professor Livingston Farrand, the Secretary of our National Association for the Study and Prevention of Tuberculosis, before the year 1905 there existed throughout the United States 115 sanatoria and special tuberculosis hospitals. In the year 1905, 15 of such institutions were established; in 1906, 17; in 1907, 35; in 1908, 71; and during the first three months of 1909, 39; so that we have to-day in the United States all told 289 institutions where patients are housed,

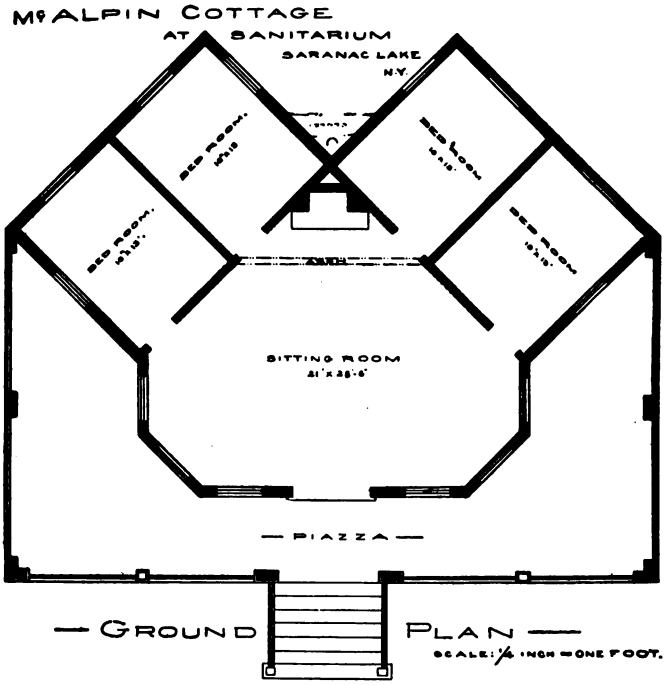

FIG. 84. Adirondack Cottage Sanatorium, Ground Plan of McAlpin Cottage.

boarded, and kept under constant medical supervision. These institutions are justly called closed establishments, that is to say, they are exclusively consecrated to tuberculosis cases, and no other class of patients are received there.

I can only reproduce here a few illustrations of the many useful private, philanthropic, and semi-

FIG. 85. Agnes Memorial Sanatorium, Denver, Colo. Sleeping Gallery for Women. Erected by Mr. Lawrence C. Phipps as a Memorial to his Mother. Rates: $9.00 to $12.00 per Week.

FIG. 86. Agnes Memorial Sanatorium, Denver, Colo. Male Patients Taking the Open Air Rest-cure.

philanthropic institutions in this and many foreign countries; all of them are doing a vast amount of good, not only as curative but also as educational agencies. (Figs. 81 to 104.)[1]

I wish it to be distinctly understood that in selecting the institutions for illustration I was not guided by any preference for one or the other, but simply by a desire to give an idea of the various types of construction now in use for the treatment and care of consumptives in the various climes and sections of our own and other countries. It may be said that in Europe the one-house system is in favor, while in the United States the cottage system with from four to five patients is more universally adopted for private institutions. The larger private sanatoria have, as a rule, also an infirmary where patients who need special care or supervision are temporarily housed.

It is the constant outdoor life in pure air, the abundant but carefully regulated diet, and the constant medical guidance and supervision which the patient receives in the sanatorium that has achieved

[1] For complete and detailed information concerning other philanthropic, semi-philanthropic, and private sanatoria, the reader is referred to the directory of institutions of the United States and Canada, compiled under the direction of the National Association for the Study and Prevention of Tuberculosis by means of the Russell Sage Foundation.

Fig. 87. Barlow Sanatorium, Los Angeles, California. Semi-philanthropic. Rates: $5.00 to $7.00 for those who are able to pay. Others Are Cared for Free of Charge.

such wonderful results. The patient sleeps outdoors at night; he rests in the reclining chair taking what is known as the "cure" during the day; the amount of exercise is prescribed by the physician so that it will do him good and not harm; the slightest intercurrent trouble is reported to the physician.

In the sanatorium the precautions, concerning the expectoration and all that appertains to the prevention of infection, are so thorough that it may be said one is more secure from contracting tuberculosis within its precincts than anywhere else. The contracting of tuberculosis by physicians and attendants in the sanatorium is of the rarest occurrence.

This brings us to the very interesting topic of the medical and social mission of the sanatorium for consumptives. Of its curative mission we have already spoken. The educational mission of sanatoria for consumptives is so important that, according to some authorities, it overshadows all others. In the sanatorium the patient is taught how to dispose of his sputum and how to guard against drop infection. He is taught how to cough, when to cough, and when not to cough. He learns to live in fresh, pure air by day and by night. He learns when to eat, how to eat, and what to eat. He learns how to breathe, how to exercise, and when

Fig. 88. Edward Sanatorium at Naperville, Near Chicago. For Incipient Cases Only. Dr. Sachs Is the Visiting Physician, a Nurse Is in Charge of the Institution. Ten Beds Are Maintained by the Nurses' Association. Rates $10.00 per Week.

to exercise, and what to do in order not to catch cold. He learns not to be unduly alarmed at the sight of blood in the sputum. He learns to be hopeful and cheerful, and that he must labor to get well. When he returns home cured or improved, he will impart all his knowledge to his family, friends, and neighbors, and become a hygienic factor in the community.

To the public at large the well-equipped sanatorium teaches that phthisiophobia is as unjust as

FIG. 89. Gaylord Farm Sanatorium, Wallingford, Conn. Semi-philanthropic. Rates: $7.00 per week. The State appropriates $7,500 annually. Deficit made up by voluntary subscriptions. An interesting feature of this Institution is that many physicians who have sent patients there visit the institution and, by courtesy of Dr. D. R. Lyman, the Superintendent, are permitted to reëxamine the cases and watch their progress.

FIG. 90. Loomis Sanatorium, at Liberty, New York. Private. Rates: $15.00 to $40.00 per Week.

it is cruel, and that a patient who takes care of his expectoration and guards against droplet infection is as safe an individual to associate with as any one. It, furthermore, teaches that sanatoria for consumptives are no danger to the neighborhood. The statistics of the two villages Goerbersdorf and Falkenstein, where five of the largest German sanatoria have been located for many years, show that the mortality from tuberculosis has been reduced by one-third from what it was before the establishment of these institutions.

In Rutland, Mass., where the Massachusetts State Sanatorium is located, during the six years after the opening of the sanatorium there have been only eight deaths from tuberculosis annually with an increased population, while prior to the establishment of the sanatorium, among a smaller number of people, they had fourteen deaths annually from this disease. Almost as marked a reduction has been reported by Dr. Elliott of Gravenhurst, Canada, where sanatoria for early as well as for advanced cases of tuberculosis have been established for nearly ten years.

Besides educating individual patients and the community at large, the sanatorium offers excellent opportunities for young physicians who enter there as assistants to become expert diagnosticians and experienced phthisiotherapeutists. The knowl-

FIG. 91. Sleeping Porch, Mary Lewis Reception Hospital, of Loomis Sanatorium.

edge gained by a year or two of service in a sanatorium for consumptives will make the young practitioner, if he does not wish to continue in institutional work, an ideal family physician, well equipped to treat the most frequent and prevalent of all chronic diseases.

The trained nurse, taking a post-graduate course in a sanatorium for consumptives, will gain valuable experience which she can utilize advantageously after she returns to her private work as a general nurse.

The last mission of the sanatorium is to help, to better, to uplift, and to harmonize social differences.

There is no denying the sad fact that the excessive use of alcohol is to be found among the rich as well as among the poor of nearly all nations. In a sanatorium, the regular mode of life, the strict prohibition of alcoholic drinks, except in rare instances for medicinal purposes, may therefore well be considered an important social factor in helping to reduce that curse of so many civilized nations—alcoholism. The belief that alcohol is a preventive, or a sure cure for consumption, is not confined to any one country. I have met with this erroneous conception among the people of Europe as well as of America, and it is not always exclusively to be found among the so-called submerged or ignorant poor.

FIG. 92. Rest-a-While and Original Lean-to, Devised by Dr. H. M. King. Loomis Sanatorium Annex for Intermediate Division. Rates: $10.00 to $12.00 per Week. There Is Also a Semi-philanthropic Division for Early Cases only: $5.00 per Week.

The regularity of life in a well-conducted sanatorium also tends to make the careless individual a careful one, the thoughtless a more thoughtful. In a people's sanatorium the uneducated patient is given an opportunity to increase his knowledge, and the one who has had no opportunity of acquiring good manners will be taught them.

Nearly all the European and American sanatoria offer intellectual and educational advantages to their inmates. The sanatorium often confers benefits even ethically and morally. A prolonged sojourn in such an institution will probably always leave a deep impression on the social views of the consumptive individual. Be he ever so rich, aristocratic, or even indifferent to his fellow-men, he will become more democratic and more benevolent; he will feel more for his comrades than he has probably ever felt before. There often appears a spirit of the truest charity among sanatorium inmates, and it was my good fortune to witness such a manifestation among well-to-do and aristocratic tuberculous patients at Falkenstein while I had the honor of serving as assistant to my regretted and immortal teacher, Geheimrath Dettweiler. As a result of the deep feeling for the suffering of the consumptive poor outside of the sanatorium, who were deprived of the care and comfort of institu-

FIG. 93. Patients at the Loomis Sanatorium Exercising Just Sufficiently to Help Along the Cure.

FIG. 94. New Mexico Cottage Sanatorium, Silver City, N. M. Private. For Pulmonary and Laryngeal Tuberculosis at Curable Stage. Rate: $83.00 per Month.

tional treatment, these well-to-do patients contributed largely to the establishment of the first people's sanatorium in Germany, now located at Ruppertshain. Later, this institution was largely benefited by the generous bequest of a patient who, during his last few months, had received the tender care of the physicians and devoted nurses at Falkenstein. Our own beloved Trudeau who, twenty-five years ago, in the wilderness of the Adirondack Mountains, started with one little cottage and two poor patients, owes the existence of the now great and justly celebrated Adirondack Cottage Sanatorium (Fig. 78), comprising about thirty cottages, with a large administration building, infirmary, library, and church, to liberal contributions from rich and grateful tuberculous patients.

FIG. 95. Nordrach Ranch, Colorado Springs, Colo. For First and Second Stages. Private. Rates: $60.00 to $65.00 per Month.

Besides the sanatorium, the special hospital, and the dispensary, there are other methods which of late years have proved efficacious in the care of tuberculous patients, and particularly of the consumptive poor. We refer to the day camp, the night camp, and the class method already described in connection with the Emmanuel Church work.

The day camp idea originated in Germany in 1900, under the name of "Walderholungsstätte," which might be freely translated as a health station in the forest. The first day camp for consump-

FIG. 96. The Sharon Sanatorium, Eighteen Miles from Boston. Semi-philanthropic. Rates: $5.00 per Week. For Women of Limited Means.

FIG. 97. A Two Room Compartment Tent of the Star Ranch, Colorado Springs, Colo.

tives in the United States was, I believe, established by the Boston Association for the Relief and Control of Tuberculosis.

The purpose of such a day camp, which is usually located in the healthiest locality of a city, preferably in wooded regions, is to receive patients during the daytime, to provide the consumptive patient with a comfortable chair for the rest-cure in a pleasant and sheltered spot, and to provide him with one or two substantial meals and milk and eggs between times. The patients are, of course, taught to be exceedingly careful with their expectoration and instructed in all other hygienic measures essential for their own and their associates'

FIG. 98. Muskoka Cottage Sanatorium, Gravenhurst, Canada.

well-being. A physician and nurse supervise the treatment and care.

It was not only in Boston that the first day camp was established, but to the city of Boston also belongs the credit of having established the first municipal day camp.

Under the auspices of the Red Cross a number of day camps for the tuberculous have since been established in Washington, Schenectady, Albany, New York, etc. Of one of them, located on the roof of the Vanderbilt Clinic, we take pleasure in reproducing an interesting photograph. (Fig. 99.)

FIG. 99. Red Cross Day Camp on the Roof of the Vanderbilt Clinic.

Of the educational value of such a day camp there can be no doubt. For cases for which no places in sanatoria can be found, it offers, at least, a temporary substitute for sanatorium treatment. Of equally great value is it as a temporary sojourn for a patient discharged from a sanatorium, but in need of after-treatment.

To the best of my knowledge, the credit of the night camp idea belongs to Dr. William Charles White, medical director of the Tuberculosis League in Pittsburg, who first proposed it to the profession. Of these latter institutions we have as yet but very

FIG. 100. View of Davosplatz, Switzerland, where Numerous Private and Philanthropic Sanatoria Are Located.

FIG. 101. Sanatorium Falkenstein near Frankfort on the Main, with Ruin of Falkenstein Castle in the Background. Private.

few in this country; still, it is my firm conviction that night camps do as much good as day camps. Many a tuberculous patient is obliged to work for his own maintenance or the support of his family. Upon the advice of his physician he may have changed his indoor work for an outdoor occupation, yet what good does it do him if he is obliged to sleep in an unsanitary tenement or lodging house? And to what danger is not his family exposed when they are numerous and obliged to live in close proximity with the sufferer?

I am convinced that the greatest number of infections originate in the sleeping rooms of our consumptive tenement house dwellers, and at night-

FIG. 102. Sanatorium Wehrawald and the Village of Todtmoos in the Black Forest, Germany. Private.

time. It is then that the consumptive member of the family unconsciously expels the bacilliferous droplets during the cough, which render the atmosphere infectious. Fearing to have the other members of the family feel uncomfortable or cold, he will consent to have the windows closed at night, or close them himself in spite of the doctor's injunction to keep them open.

Through the night camp, the family of the consumptive will be protected and he himself assured of a good bed in a well-aired room or shack.

In Canada there exists, under the management of Dr. Arthur J. Richer, an institution in which individuals who for one reason or another are not strong, either because they are just recovering from pleurisy, pneumonia, or grippe, overworked or predisposed by heredity, are received and treated with a view of preventing a possible development of tuberculosis. I have given to that institution the name preventorium and it would seem to me an admirable idea if these preventoria were to be multiplied throughout the world. They certainly would constitute a mighty factor in the crusade against tuberculosis.

It must be evident that to carry out, in a city like New York, such class methods as have been described in this chapter, one will encounter a great

FIG. 103. Dr. Weicker's Sanatorium in Goerbersdorf, near Breslau, Germany. Private.

many difficulties which are easily surmountable in a smaller community. Outdoor sleeping on a veranda, or in a yard, or even on the roof under present conditions, is practically impossible in a large city. After much experimenting I succeeded in getting a fair substitute in the window-tent, illustrated in Chapter V (Fig. 21); but a window-tent is, of course, not quite equal to actual outdoor sleeping, as the window itself may not always have access to the best of fresh air, and the tent does not provide sufficient circulation in hot weather.

The class method, furthermore, can only be successful when the patients comprising "a class" do not live too far apart, and when they can be visited and supervised by a nurse, and whenever necessary, by a physician. Thus, the ideal for class method treatment would be a house especially built and constructed for the purpose; in other words, a house where tuberculous patients could have the best sanitary arrangements, with balconies for outdoor sleeping, and the building be constructed in every way to answer the particular purpose of caring for families with tuberculous invalids. My distinguished colleague, Dr. Henry L. Shively, had the good fortune to find, in Mrs. Wm. K. Vanderbilt, Sen., a philanthropic lady willing to carry out the plans for such sani-

Fig. 104. Royal Hospital for Consumptives at Ventnor, Isle of Wight, England.

FIG. 105. The Proposed Shively Sanitary Tenements; Street View. Built by Mrs. Wm. K. Vanderbilt, Sr.
Henry Atterbury Smith, Architect.

tary tenements, which will soon be erected in this city.

I am indebted to him for the accompanying photographs (Figs. 105, 106) of what will be known as the Shively Sanitary Tenements, and which will occupy the center of the block on Avenue A, between 78th and 79th Streets.

Each of these four tenements will be built in the form of a hollow square, with a court 30 by 31 feet

in the center, which will be decorated with turf and flowers. To enter an apartment the tenants will have to go through the archway leading into the court, and then up one of the four staircases built in the corners of the court. The staircases will be open to the air and will run to the roof, and every apartment will open directly off the staircase. This will give each of them a separate front door.

On the roofs will be erected comfortable loggias. Wind-breaks of glass will be set up on the north side. The floors will be tiled. Shrubs will make the place bright and steamer chairs will be set ready for the tenants. Toilets will also be provided for men, women, and children.

It is hoped by this means to encourage the open air life of the people to the utmost extent. They will be able to enjoy fresh air without going to institutions, and a great deal of expense will be thereby saved to them.

Every apartment is to be provided with a balcony. The tenements are to be six stories high, and a row of balconies is to be erected for each story. To give access to them, the windows will be built in three sections, so as to open from the floor to the ceiling. Tenants may sleep out on them, or, if the windows are thrown open to the top, the room will be practically part of the balcony.

To secure the proper ventilation of the courts

FIG. 106. The Proposed Shively Sanitary Tenements; Court View, Showing Open Staircases.

inside the tenement houses, a passage will be cut through. For the ventilation of the rooms, it is planned that every apartment shall have windows opening on to both the interior court and the exterior of the tenement house. By this means it will be possible to obtain a regular stream of air through an apartment at any time. The apartments will be from two to five rooms each. They will conform with the tenement house regulations and contain from 70 to 120 square feet each. It is hoped that it will be possible in every case to install a bath. Gas rather than coal ranges will be provided in order to get rid of the trouble in handling ashes.

With the aid of the Shively tenement homes, it seems certain to me that the class method of treatment as conceived and so successfully carried out by Dr. Pratt, can very well be imitated in New York. It was suggested to me by another philanthropic lady, interested in tuberculosis work, that it would be a good idea to have in each tuberculosis dispensary district of a great city one or two of such sanitary tenements, and to induce as many as possible of the dispensary patients to reside in these ideal homes. If the rent in these sanitary tenements should be higher than in the average tenement house, it would probably be a judicious expenditure on the part of charitable institutions and charitable indi-

viduals to pay the difference as an inducement for tuberculous patients to occupy these apartments. The tuberculous inhabitants of each open air tenement house could constitute a class, and the supervision of physician and nurse, when all the patients are under one roof, would certainly be easy and at the same time most efficacious.

It would seem that these open air tenements might almost solve the problem for the early cases among workers in cities, if we could only have enough of them; but we must not forget the advanced cases. The incurable and refractory patients must be segregated, else they are a menace to their families and the community as well. Institutions for them are urgently needed in our country at present. Professor Edward T. Devine, in his new book "Misery and its Causes," pleads eloquently for them, and in recent addresses before our National Anti-tuberculosis Association the Hon. Homer Folks, Ex-Commissioner of Charities, and Professor Wm. H. Welch stated that the greatest need in America at this time was for such institutions. Dr. Welch said that in the opinion of Professor Koch and Professor Newsholme the marvelous reduction in tuberculosis in England and Scotland (Glasgow 42%) was largely due to the institutional segregation of advanced tuberculous cases.

CHAPTER XI

THE DUTIES OF THE PEOPLE IN THE COMBAT AGAINST TUBERCULOSIS

"The people have recognized their true foe in tuberculosis and are stirring to the combat throughout the civilized world." These significant words recently spoken in an address before a large anti-tuberculosis gathering, by the foremost authority in American pathological science, Professor William H. Welch of Johns Hopkins University of Baltimore, are indeed encouraging.

The opportunities for every layman to learn something of what he should know about tuberculosis are certainly not lacking. Literature abounds, daily papers often speak of it, and lectures are given under the auspices of tuberculosis committees, boards of education, and health boards. These lectures are always free, and upon a request addressed to any board of health, it is not difficult to get literature and information.

The one thing which the people at large should realize above all others is, that it is necessary to seek the advice of a physician at the earliest possi-

ble moment in a tuberculous affection. If he is too poor to pay for a private consultation, there are in every city, or if not there ought to be, tuberculosis dispensaries for the poor to which the patient should apply.

To enable even a layman to recognize the early signs of the disease, I would say that any or all of the following symptoms may be present in the beginning of a pulmonary tuberculosis: A long continued cough or hoarseness; loss of flesh; flushes or pallor in the face; feverish sensation in the afternoon; occasional night-sweats; a chilly sensation every morning; a loss of appetite; sometimes a little streak of blood in the expectoration; loss of strength manifesting itself in getting tired easily; frequent colds; a perceptible quickening of the heart-beats after slight exertion; a little change in disposition, at times an increased irritability or a feeling of depression; a disinclination to pursue certain work which the individual formerly loved to do, or even a disinclination to pleasures which were formerly enjoyed. I do not mean that any one should be frightened on discovering any of these symptoms and imagine that he has the rest of them. Some of them may be present, and on examination no tuberculosis may be found. It is then all the better for the patient; but when any of these symptoms are present, or persist at all,

they should be considered a warning sign, and it is always best in such a case to consult a physician. It can not be said too often that the earlier the tuberculous patient submits himself to proper treatment, the greater are his chances for recovery. One more point regarding early symptoms must be mentioned; namely, that cough is not, as is often considered by laymen, an ever present symptom in early tuberculosis. It may be entirely absent in the beginning.

The public at large should know that the disease is preventable and curable. What we have endeavored to teach in Chapter II to those living with the patient, should really be known by all people, for we can never tell how soon we may have a tuberculous patient in our midst. In spite of the reduction in mortality since the recent active work against this disease, still out of every seven deaths one is due to tuberculosis, which means that in the United States about 200,000 individuals die annually from the white plague. In the world at large, one individual dies every three seconds of one form of tuberculosis or another. The most frequent is, of course, the pulmonary type, or consumption.

In Chapter II we have emphasized the fact that tuberculosis is very rarely directly hereditary; but that what is often transmitted by tuberculous

parents is a weakened system or physiological poverty. We have already stated that by proper training a child born under such conditions may grow up to become a strong, healthy man or woman. Nevertheless, it is evident that tuberculous individuals ought not to marry, and when tuberculosis develops in a married couple it is best that they should have no children. The child conceived and born while the mother is suffering from pulmonary tuberculosis in the advanced stages, has little chance for life; or, at least, a great deal less than in a case where the mother has been afflicted with the disease only in the incipient stage. The same is perhaps true even when the father is the tuberculous parent. But whichever it may be, the father or the mother, the work to overcome the predisposition to tuberculosis in infancy and childhood must begin before the child is born. The mother who fears the transmission of a tuberculous predisposition to her child must, throughout the child-bearing period, live in the best possible hygienic environment, in the purest air obtainable and, from the earliest recognition of her condition, refrain from wearing restricting garments. She should often breathe deeply and, in fact, she should take regular breathing exercises until the desire for deep breathing becomes natural to her. The kind of breathing exercise which a pregnant

woman can take without fear of harm in her condition, but which on the contrary will benefit her, is the following: She takes a deep inhalation and during this act raises the shoulders, rolls them backward and holds the breath for three to five seconds while in this position. (See Fig. 66.) Then she exhales while moving the shoulders forward and downward. This exercise which she should take frequently every day she should, of course, only practice in pure air, preferably near the open window or when outdoors. It is evident that not only the respiratory, but also the circulatory, in fact the whole system, must be benefited by such a practice of deep breathing.

The living and the sleeping room of the pregnant woman should always be well ventilated and at least one window should be kept open in the bedroom even in cold weather. While it is hard to demonstrate that the fear so many people have of night air is indirectly responsible for a good deal of tuberculosis, I nevertheless believe this to be the case. Some people will sleep in a small bedroom, often several individuals together, with windows tightly closed, breathing the same air over and over again, and thus each surely poisoning himself with the toxic products of his own exhalation and that of the other sleepers.

The newly born child is as much in need of pure

air as the grown up person, and while in early infant life the system requires more warmth, the air the child is to breathe must be free from dust and other impurities. The lying-in room and nursery should be well ventilated and their temperature well regulated. The atmosphere in such rooms should be warm enough, but never be too hot or too dry.

As the young child grows, it should gradually become accustomed to cooler air. The habit of enveloping the child's face in a thick veil when it is taken out for an airing is absurd, and if veiling is used at all, it should be thin, permitting the air to have access to the face. As the child grows up, attention should be paid to its breathing. It should be noted whether it breathes through the nose as it should, or whether the nose seems obstructed and it breathes with its mouth open. It must be remembered that mouth breathing in children is a predisposing cause to frequent colds, to bronchitis and similar affections, all of which in many instances must be considered fore-runners of consumption. Mouth breathing in children is caused, as a rule, by certain growths in the throat (adenoid vegetation) and sometimes by enlarged tonsils, or by polypi in the nose. Besides its deleterious influence on the child's respiratory system, adenoid vegetation may also result in difficulty of hearing,

consequent impairment of the intellect, and even in actual deformities of the jaw. Adenoids and all other obstructions to free breathing should be promptly removed by timely operations.

When a child, because of its delicate constitution, is susceptible to frequent colds, so that one may hesitate to take it much outdoors, it should be borne in mind that fresh, pure air really does not give colds. What are commonly known as colds are often an infectious disease due to a specific microörganism which fastens itself more readily on a delicate system. To overcome such a susceptibility to colds, one should resort to the judicious use of cold water.

From the tenth to the twelfth month one should accustom the child gradually to cold baths. The best time to begin is after its daily warm bath. Rub the child a few times with the hands dipped in cold water, and then wipe it rapidly. By and by one may begin with cold sponging, and later with a little douche. In the use of cold water it is absolutely necessary that the reaction should follow rapidly. This reaction, as is well known, is manifested by a pleasant warmth perceived by the child, and is made visible externally by a reddish appearance of the skin. Whenever cold water is applied to the skin, one will notice at first a certain whiteness or pallor which is caused by the contrac-

tion of the external blood vessels. The return of the blood to the surface causes a reddening of the skin. Whenever reaction is lacking or tardy, the advice of the physician should be sought.

Of course, it goes without saying that a child should always be properly dressed. In order that its lungs may develop to the fullest extent it must not be hindered by restricting garments, particularly by tight neckwear, collars, or bands. Furthermore, it must be remembered that to dress the neck too warmly lessens the power to resist taking cold when there happens to be a change in the atmosphere. The less one is accustomed to bundle up the neck, the more freely will one breathe and the less will one be likely to take cold.

When a girl develops into a young woman, one should bear in mind that the tightly laced corset is one of the most injurious garments that can be worn. Not only is free and natural breathing interfered with by this article of dress, but indigestion and disturbances in the circulation follow excessively tight lacing. Anæmia, or poverty of blood, so often observed in young girls, can very frequently be ascribed to this unnatural mode of dress which does not permit either a free circulation or sufficient oxygenation of the blood.

We reproduce here three pictures to better illustrate the results of excessive lacing. Figure 107

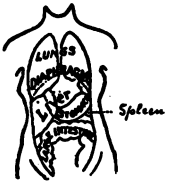

FIG. 107. Situation of Vital Organs in a Normal Chest.

Fig. 108. Situation of Vital Organs in Constricted Chest.

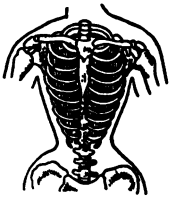

FIG. 109. Skeleton of Chest, Permanently Constricted by too Tight Lacing.

shows the situation of the organs in the chest and abdomen in a normal thorax. Figure 108 shows lungs, liver, and intestines as they appear in a thorax constricted by wearing a tightly laced corset for a number of years. Figure 109 shows the skeleton of a chest deformed by tight lacing.

In the preceding chapters we have spoken of child labor in factories and workshops, and of too much work at school; but there is another way in which the child's constitution may be injured and for which the parents are responsible. I refer to child labor at home. Often, thoughtlessly, parents make little girls in their teens take care of the smaller brothers and sisters and force them to help cook and to wash, and I know of families in which the same duties are imposed upon the young boys who, in addition, have to do all the errands of the family. When one considers that these children must also go to school, one can fully realize

how dreary their little lives must be, how little play they have, and how their health must become undermined because of the great physical strain which is put on their growing organisms and because of the lack of healthful outdoor exercises. Particularly pathetic is the lot of little boys and girls between the ages of ten and fourteen who, because of the loss of one parent, father or mother, must fill the vacant place while the remaining parent is absent to earn a living for the family. In such instances the older girl or boy must often be the servant of the family. I have seen "little mothers" in the tenement homes whose lives were virtually sacrificed, they having developed tuberculosis because of the physical strain put upon them.

It does not require much for the tubercle bacillus to get the best of such an enfeebled child's organism. Parents should bear this in mind, and everybody who can help to prevent such conditions should do his utmost to save the lives of the little children.

As soon as the intelligence of the growing child will permit, it should be taught to breathe deeply, and later on be taught the exercises which we have described in full in Chapter IX, when speaking of prevention of tuberculosis during school life.

In speaking of the social mission of the sana-

torium, we have mentioned the fact that alcoholism must be prevented in order that tuberculosis may be cured, and here we wish to say that the excessive and injudicious use of alcoholic drinks, particularly whiskey and the stronger liquors, is a very pronounced predisposing factor to tuberculosis. I am of the opinion that as long as there is excess and intemperance in the use of alcohol as a beverage, so long will it be impossible to stamp out tuberculosis.

It is not only well known that alcoholism predisposes to tuberculosis, but it has also been statistically demonstrated that the children of alcoholic parents contract tuberculosis more readily than children of temperate parents. In my labors among the poor I have often sought to convince tuberculous patients of the folly of spending money for alcohol as a means to cure the disease. If they would spend the same amount of money for nutritious food, they themselves would probably have been cured, much more readily, and their families could have lived in greater comfort.

There are sometimes cases of consumption in which the judicious administration of alcohol as a medicine is indicated, and I would therefore regret if ever a law should be enacted which would prevent a physician from prescribing alcohol in the treatment of disease.

Since the alcohol problem is one of the factors of the tuberculosis problem, I feel justified in giving a few suggestions on this great question. While I believe that excessive use of alcohol is responsible for more disease, more tuberculosis in particular, and also more crime than any other one cause, I still question the wisdom of absolute prohibition in our present state of civilization.

Could the Gothenburg system be carried out in the United States, I would certainly favor it as a means of decreasing intemperance, and consequently crime and disease. This system consists in the manufacture and sale of alcohol by the government, and giving the dispenser of alcohol a salary, so that no benefit shall accrue to him from the amount of alcohol he sells. The law strictly prohibits the sale of liquor to the intoxicated, the habitual drunkard, and to minors. I am almost tempted to suggest this method to some of our prohibition states—it would probably tend more to decrease intemperance than prohibition laws do now as they have worked in some places. However, with a heterogeneous population like ours, the same laws are perhaps not applicable to every state. Prohibition has decreased crime in the South among the Negroes, while, if I am correctly informed, crime and arrests for intoxication are on the increase in Maine.

It is the same with individual states as it is with individual men and women. They have their idiosyncrasies, peculiarities, and different constitutions. Some people can not take a teaspoonful of liquor without feeling the intoxicating effect; others can not drink the smallest quantity without a desire being aroused for more than is good for them. It must be self-evident that these types of people with peculiar constitutions should religiously refrain from taking alcoholic drinks.

That a low type of saloon is injurious to any community every one will admit. It would seem that in most of our states it will be difficult to enforce strict prohibition laws. To create by a higher license a higher type of saloon and diminish their numbers, must surely have a good effect.

What in my humble opinion is injurious to the individual as well as to society, causing many a man to become intemperate is, on the one hand, the American treating habit, and on the other, the habit of taking alcoholic drinks on an empty stomach and between meals. For all this I have but one remedy—education. The treating habit, so far as liquor is concerned, must be abolished by teaching the young through the practice and example of the adults, that the custom is wrong and should be discountenanced.

There should be institutions for the cure of the

habitual drunkard to which he may go himself or be committed by the court, if his conduct is such as to make such a procedure justifiable.

There are few men, and, perhaps, not one woman in this country who would not be willing to do something toward the decrease of alcoholism and its concomitant social misery. If well-meaning men and women would unite in their efforts to suppress the treating habit by practice and example, and would pledge themselves never to partake of alcohol except in moderate quantities with their meals and in diluted form, I am convinced that a greater step toward temperance would be made than by any other means heretofore employed.

Aside from this, I believe that the building of model tenement houses by private or municipal enterprise, the creation of more parks and playgrounds and healthful places of amusement open Sundays and week-days, where the laborer can partake of non-alcoholic drinks and enjoy the society of his friends, will do more to do away with alcoholism than many a more strict measure.

In short, let us not forget that to combat alcoholism we must combat social conditions creating misery and want. If there was more social justice, we would need to have fewer charitable institutions. While it is true that alcoholism begets crime, misery, and unhappiness, it is equally

true that much misery and suffering begets alcoholism. In a civilized country like ours there should never be such a condition as a man willing to labor, but obliged to suffer misery and want for want of labor.

There is, indeed, a great opportunity in this respect for practical statesmanship and practical philanthropy. I am convinced that in a community which provides labor and just pay for all those willing to labor, there will be need of fewer police, fewer prisons, penal institutions, and insane asylums, while the commonwealth will, in the end, gain in all respects morally, sanitarily, and financially.

Where it is feasible for laborers working in the open, and also for those working indoors, cool, non-alcoholic drinks should be dispensed in summer and warm ones in winter, at reasonable rates.

Lastly, I would suggest that well-kept comfort stations should be more numerous throughout our large cities than they are at the present time. A municipality which will do its duty in this respect will prevent the necessity of men going into saloons for calls of nature, and then feeling called upon or being tempted to spend money there for drink.

We have already referred to the proper housing of the masses, and would emphasize here that unsanitary housing and lack of sunlight and air in

the home must be considered a strong predisposing factor to disease. It brings about the acquired type of predisposition to tuberculosis. While the individual laborer and employee may not always be able to procure the necessary ventilation he would wish to have while at work, he ought to be able to have it at his home. He should practice and teach his family the love of fresh air, deep breathing, and particularly keeping the bedroom windows open at night. During the warmer seasons, outdoor eating, outdoor concerts, outdoor theatres, etc., should be encouraged. We can learn much in this respect from European cities.

In the preceding chapters we have spoken of the value of cooking-schools for children and adults, and also of the value of housekeeping centers. It is a well-known fact that there is a great deal of waste of food substances in the homes of the poor because of ignorance, and much of the bad feeding and underfeeding of the masses is due to lack of knowledge. It can not be urged strongly enough upon married women and girls, the future mothers of the nation, to avail themselves of all possible opportunities to learn practical, economic, and healthful cooking, and practical and sanitary housekeeping.

People in general should embrace all opportuni-

ties to learn what they can about the prevention of disease. They themselves should practice all they know concerning these important matters; lead sober, regular lives; be temperate in all things. They should practice clean living, plain cooking, and clean housekeeping, the utilization of fresh air and sunlight. Everybody should make it his rule, whether tuberculous or not, never to expectorate when indoors except in a proper receptacle (spittoon or cloth); and when outdoors, if he must spit, to spit into the gutter but never on the sidewalk.

In cases where prohibitions against expectoration are posted, or other health notices, the public should take particular pains to heed them and not act in a spirit of opposition. When an employer is trying to do his best to look out for the sanitary condition of his employees, they should coöperate with him in every way possible in order to reduce the sources of infection or causes of predisposition.

The public should attend the popular lectures on health and sanitation, not neglecting those on the prevention of tuberculosis. They should remember that the knowledge thus gained is power and will help in preventing disease, misery, and death. Every individual, in no matter what walk of life, can help to prevent tuberculosis, and to do

this means happiness for others and happiness for himself.

When speaking of the care to be taken in the disposal of sputum (Chapter I), we mentioned how the housefly can become a conveyor of infection. It can spread tuberculosis and other diseases. How easily can nearly every one help in the extermination of this insect!

It should be the duty of every one to remember this and do what he can to prevent this source of infection. Every fly in the sick room, no matter of what disease a patient may suffer, should be killed. Since the fly breeds in manure in preference to all other places, we must concentrate our attention to the destruction of this insect in its early stages. To this end all vaults and pits containing stable manure should be screened or sprinkled with lime or kerosene. All garbage, vegetable matter, or other decaying material tending to attract flies should be covered. Some municipal ordinance concerning stable hygiene with a view of preventing the breeding of flies and the screening of all articles of food exposed for sale, would be most timely. However, the individual also must do his duty by screening windows and doors, especially those of the kitchen and dining room, and the covering of all food substances.

Another method whereby every individual, no matter in what station of life, can be helpful in preventing tuberculosis in himself, his friends and neighbors, is by his example of love for fresh air. We have spoken of this a number of times in reference to the cure as well as to the prevention of tuberculosis, but it can hardly be emphasized too much. If one can not sleep in the open air, he can certainly have his window open at night. If his occupation demands a great deal of indoor life, or perhaps makes inhalation of dust unavoidable, he should be all the more eager to spend his leisure hours in the fresh air, to breathe deeply often when in pure air, to avoid places of amusement where the air is impure, smoky, and dusty, and to keep regular hours, and be moderate and temperate in all things. He will thus be doing all he can to counteract whatever bad effect his occupation may have on his health.

It is not only in the prevention of tuberculosis that any individual may be able to help by spreading the knowledge he may have, through the practice of it or by imparting it to his neighbor or friend in a tactful manner where it is most needed, that is to say, to an untrained consumptive; but every well meaning citizen, young or old, even in the most moderate circumstances, will also have opportunity to help in the cure of tuberculosis.

There is an excellent movement now on foot known as the Red Cross anti-tuberculosis work. The American National Red Cross issued last year, before Christmas, a beautiful stamp which bore a wreath of holly with the words "Merry Christmas" and "Happy New Year." (Fig. 110.) The stamps were sold in sheets like an ordinary stamp and also in small books (nine for ten cents, twenty-four for twenty-five cents, forty-eight for fifty cents), like the Government postage stamps. The Christmas stamp was not good for postage. It did not carry any kind of mail, but any kind of mail carried it. Some eleven million stamps were sold in the United States, which means that more than $100,000 were contributed to the Red Cross anti-tuberculosis work throughout the country during Christmas tide of 1908. The New York County branch alone netted $11,000, and one of the immediate results of this gratifying help from the people of the City of New York was the establishment of the Red Cross Tuberculosis Camp on the roof of the Vanderbilt Clinic of which we gave an illustration. (Fig. 99.)

FIG. 110. American Red Cross Stamp for the Year 1908. (Original Printed in Red.)

In the preceding chapter we have spoken of the

activities of the Tuberculosis Committee of the City of New York. While, of course, it can not be expected that such a vast activity can be carried out by every committee, much useful work can be done even on a smaller scale, and such committees should always be composed not only of physicians but also of laymen. Here again is an opportunity for helpfulness by the layman who is willing. By becoming a member of such a committee or a member of an association for the study and prevention of tuberculosis, he can show his interest and participate in the crusade against tuberculosis. Labor organizations, trades unions, workingmen's mutual relief societies, etc., should make it a point to have all their members educated in the prevention of tuberculosis, and no such organizations should exist without its committee on tuberculosis. Life insurance companies can also be helpful by distributing anti-tuberculosis literature among their policy holders, and thus help in the general campaign education. A good example in this respect was recently given by the Metropolitan Life Insurance Company through its Industrial Department at New York under the management of Dr. Lee K. Frankel.

No fair-sized community should be without its anti-tuberculosis association or committee. Of the steady growth in number and strength of such

associations, the following statistics are the best evidence.

About four years ago, in February, I made a careful inquiry concerning existing anti-tuberculosis committees and associations in the United States, and I could then only count forty-nine anti-tuberculosis bodies calling themselves associations, societies, committees, or leagues. In May, 1905, in Washington, there was held the first meeting of the National Association for the Study and Prevention of Tuberculosis under the presidency of Dr. Edward L. Trudeau. Dr. William Osler, now of Oxford, and Dr. Hermann M. Biggs, of New York, were the vice-presidents. Dr. Henry Barton Jacobs was the Secretary, and Surgeon-General George M. Sternberg, the Treasurer. Soon after this, an Executive Secretary in the person of Professor Livingston Farrand was appointed, and it is largely owing to his energy that at the end of 1906 there existed as many as sixty-two anti-tuberculosis associations. The year 1907 added forty-nine, and, at the time of writing the closing chapter of this book (March 15, 1909), there was a total of 273 anti-tuberculosis associations in the United States.

As has been already stated, these associations are composed of lay and medical men and women. This speaks well for the growing interest in the anti-tuberculosis cause. The present membership

FIG. 111. Proposed Quarters of National Pythian Sanatorium, Las Vegas, N. M. 1300 Acres Have Been Donated to this Institution.

of the National Association is about 1,600. Much is done, but there is more to do.

For masonic and other fraternal societies, also for mutual benefit associations of all kinds, the solution of the tuberculosis problem offers an unusual field for most humane activities; and it is encouraging to note the progress being made in this direction. The Grand Lodge of Free and Accepted Masons of the State of New York has already collected a good-sized fund and owns a tract of land on which it expects to build a tuberculosis sanatorium. The Knights of Pythias fraternity has a National Pythian Sanatorium of which they expect to make a model institution. It is located at Las Vegas, N. M. (Fig. 111.)

FIG. 112. Union Printers' Home for Consumptives. Established and Maintained by the International Typographical Union.

The Modern Woodmen have a sanatorium for their tuberculous members at Colorado Springs, and in the same place the Union Printers have a beautiful consumptives' home for their afflicted brethren, which has been erected and is maintained by the International Typographical Union. In its prospectus it very appropriately says: "Its bounty is unpurchasable; its charity without price." (Fig. 112.) At the recent meeting of the Supreme Council of the Royal Arcanum, resolutions urging the establishment of a tuberculosis sanatorium by that order were presented and

FIG. 113. Krankenheim of Dr. H. Weicker at Goerbersdorf (Germany), to Which Life Insurance Companies Send Their Tuberculous Policy Holders, Immediately After the Recognition of the Disease.

passed. At Black Mountain, N. C., there has existed for a number of years a sanatorium established by the Royal League.

There is one more very important field of interest to the populace at large in the direction of prevention as well as of the cure of tuberculosis. I refer to what might be accomplished in the United States by insurance against tuberculosis. This has been done in other countries, especially in Germany, with unqualified success. In the latter country insurance is obligatory against accident, old age, and disease for all laborers and employees not earning enough wages to provide, under ordinary circumstances, for any of the three mentioned emergencies. The beneficial results of such an insurance in reducing the morbidity (number of sick) and mortality from tuberculosis must be evident when one considers the following points. At the slightest indisposition or other apprehension of developing tuberculosis, the policy holder may apply for examination at the office of some of the insurance company's physicians. Thus, an early diagnosis, if tuberculosis is present, is assured. The insurance companies in Germany soon learned that when one of their policy holders was afflicted with early tuberculosis, it would be to their financial advantage to immediately institute the best possible treatment for such an in-

FIG. 114. Tuberculosis Sanatorium at Oderberg, Germany. Erected by the State Invalidity Insurance Companies for Its Tuberculous Policy Holders.

dividual, which was for the majority of this class of cases—the sanatorium treatment. They made arrangements with private sanatoria (Fig. 113) for immediate reception of their patients who being in the earlier stages were, of course, much sooner cured than had they been allowed to go on until the disease had reached a more advanced and less curable stage.

In time, these insurance companies found out that it would pay them to own and maintain sanatoria themselves. The result is that there exist now in Germany a number of this kind of sanatoria owned by insurance companies, and in flourishing condition. (Fig. 114.) While on the surface these companies have entered into this sanatorium building and managing as a business proposition, it must, nevertheless, be acknowledged that such enterprises have a very large humanitarian aspect, for many valuable lives are thus saved and a great deal of sorrow and misery spared to the masses.

It is for this reason that I most heartily recommend to our life insurance companies to imitate the German insurance against accident, old age, and disease, and not to exclude early cases of tuberculosis, nor predisposed individuals from becoming policy holders. I also recommend the building of their own sanatoria for employees and policy holders, as contemplated by the Metropolitan Life Insurance Company.

CHAPTER XII

PROSPECT OF THE ULTIMATE ERADICATION OF TUBERCULOSIS

One of the greatest scientists of the nineteenth century, a man who through his studies and the discoveries which he gave to the world, has, perhaps, done more to save human beings than any other man, was Louis Pasteur of France. (Fig. 115.) Among his writings one can find two sentences which to my mind are well fitted to inspire mankind, that is to say, every one, rich and poor, young and old, the statesman and the ordinary citizen, the physician and the tuberculous patient, to do all he can to be helpful in this world crusade against tuberculosis. The first of these inspiring sentences reads, "Il est au pouvoir de l'homme de faire disparaître toutes les maladies parasitaires" (It is in the power of man to cause all parasitic diseases to disappear from the world).

The bacillus of tuberculosis is a parasite—it need not exist. Outside of the animal organism it retains its virulence in darkness and filth, and in the human body it thrives when health is undermined

by misery, want, ignorance, or excesses. Through the education of young and old in the prevention of tuberculosis and in sanitation in general, filth, darkness, and ignorance, as causes of tuberculosis among the masses, will be removed. To convince employers of men and women that to guard the toilers against disease will be of mutual benefit, and to teach employees to share in the work, will cause tuberculosis as a disease of the masses to disappear among the laboring population. Statesmen and city fathers will learn that to take care of the consumptive poor at the right time and at the right place tends to the moral, financial, and sanitary gain of every community; and then they will not hesitate to establish sanatoria and special hospitals for the cure of all those in need of institutional treatment. By the enactment of wise and humane laws they will diminish social misery, suffering, and want.

The second of the two immortal phrases of the great Pasteur above referred to reads, "En fait du bien à répandre, le devoir ne cesse que là où le pouvoir manque," which might be interpreted into English as follows: "Our duty to do good only ends where our power to do good fails."

If the lover of his kind, the rich philanthropist, would follow this precept, do good and spread the good, help to build model tenements, open air

schools, preventoria for the prevention, and sanatoria for the cure of patients, and provide healthful recreations for the poor; and if the lover of his kind, the poor philanthropist, rich in heart but poor in worldly goods, would bring his knowledge, his good will, his labor, and his mite towards the prevention of this as yet the most prevalent and fatal of all diseases, the ultimate eradication of tuberculosis would seem to be in sight.

It is not safe to make a prophecy as to when this time will come, but it may safely be said that whatever we do in the direction of preventing the development of tuberculosis, will prevent social misery and social ills. Inasmuch as we diminish tuberculosis among the masses, we will diminish suffering, misery, and social discontent; and when the problem of tuberculosis will have been solved, this disease so graphically described as "the great white plague" forever eradicated, then will we be nearer the millennium than we have ever been before, and Peace, Health, and Happiness will be our lot on earth.

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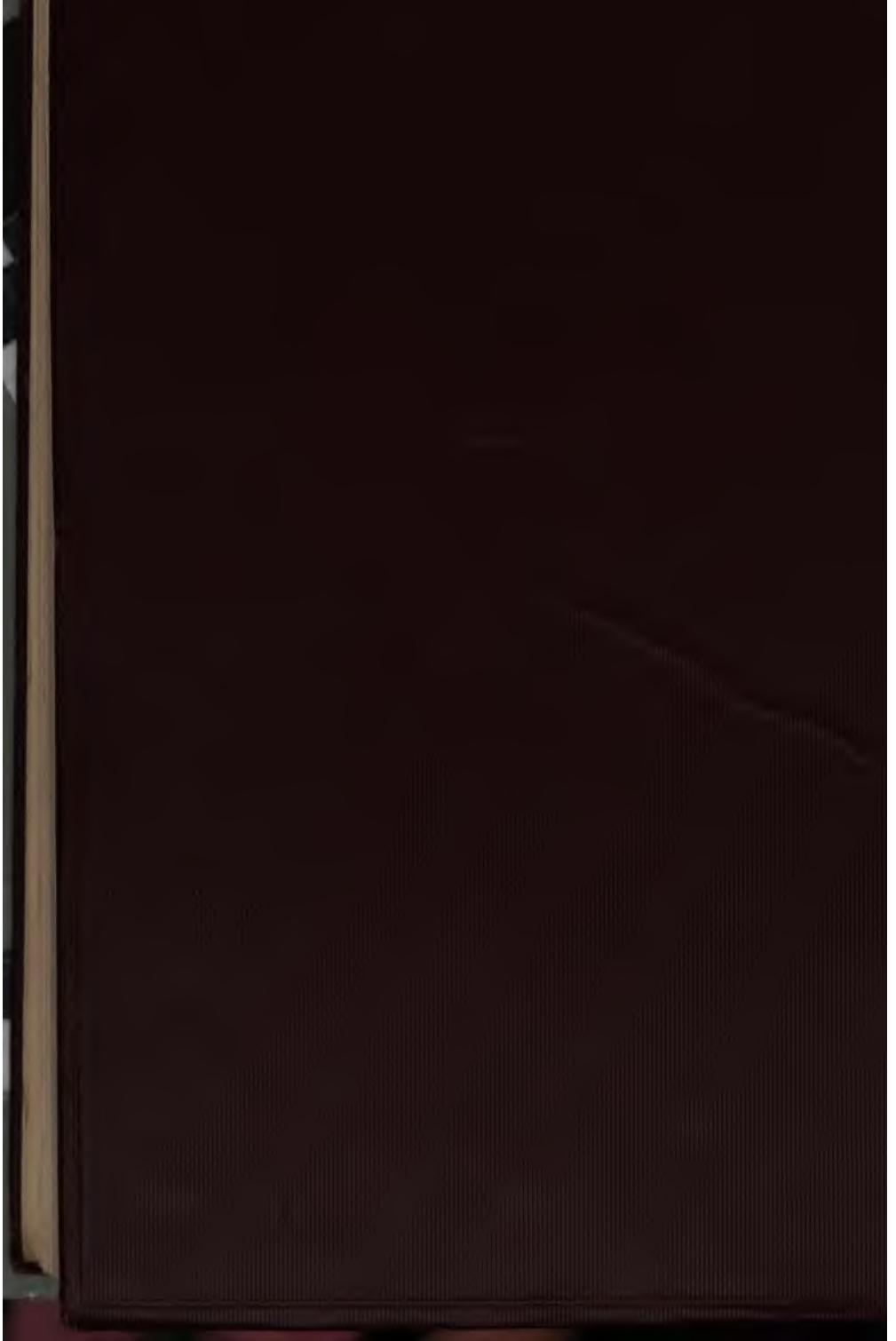
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